Southwestern Medicine

OFFICIAL ORGAN OF
ARIZONA STATE MEDICAL ASSOCIATION
NEW MEXICO MEDICAL SOCIETY
EL PASO COUNTY (TEXAS) MEDICAL SOCIETY
THE MEDICAL AND SURGICAL ASSOCIATION
OF THE SOUTHWEST

Volume XV | December, 1931 | No. 12

ANNUAL SUBSCRIPTION $2 | SINGLE COPIES 25 CENTS

Entered at the Postoffice at Phoenix, Arizona, as second class matter.
"Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized March 1, 1921."

AERONAUTICS AND MEDICINE

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President's Address

(Read before the Seventeenth Annual Meeting of The Medical and Surgical Association of the Southwest, held at Phoenix, Ariz., Dec. 3-5, 1931.)

Probably, there has always existed in the mind of man the desire to fly. Goldstrom[1] whimsically describes the mythical flight of one of the primitive flyers, as follows:

The name of the first experimental aviator has not been handed down to modernity. Probably, he was a man of pre-historic time. Conceiving the daring notion that the pterodactyl might be domesticated and ridden through the air, he decided, against the advice of family and friends, to attempt it.

Finding one of the great flying reptiles dozing on a rock in the sun, he managed to steal upon it and to fasten himself above and between its bat-like membranous wings. The next instant there was a fearful hissing squawk and a flapping and beating of huge pinions.

Terrified, but determined, the man found himself in the air. But it was only for a moment. With an angry toss of its writhing body, the pterodactyl freed itself of the impudent groundling and dashed him to the rocks below.

Down the ages, various attempts have been made to invade the air—mythical, apocryphal, and real. The first constructive advance toward this goal was made by the great Leonardo da Vinci (1452-1519) who fathered the idea of the helicopter and actually made models that would fly. Magoun and Hodgins[2] say:

It is of note that the helicopter principle, the first one to be definitely successful in achieving model flight, remains today the last one to be brought to any semblance of large scale practicality. Edison, five years after the Wright brothers' demonstration of the first successful motor-driven, man-carrying, free-flying machine, insisted that heavier-than-air flight would never be a success except upon the perfection of the helicopter principle.

To Da Vinci must likewise go the credit for the invention of the aerial screw from which has stemmed all successful present-day flight and all high-speed marine transportation—for the marine propeller is an adaptation of the aerial screw, not vice versa, as is commonly supposed.

Incidentally, Da Vinci was the first to propose the idea of a parachute.

From the time of Da Vinci until 1783, when the Montgolfier brothers sent up a balloon filled with, as they supposed, smoke, which arose to the height of 6000 feet and traveled nearly a mile and a half, there was little or no progress in aviation. Two months later Charles used hydrogen, discovered by Cavendish in 1766, to fill a balloon.

The first really successful flight of a heavier-than-air machine with a passenger was made by the Wright brothers, December 17, 1903, at Kittyhawk, North Carolina. The distance traveled was 852 feet. From this time until the outbreak of the World War, the airp'ane was in an experimental stage. Then the urge of necessity called for new means of warfare, resulting in rapid progress throughout the war and continuing to the present time.

There was a great rush of younger men to enter the air services of the various armies engaged. Anyone who had the courage to fiy was enlisted. It was soon found that more than mere physical courage was required to make a flyer.

During the first year of the war, the British found that, of every hundred men killed, two were slain by the enemy, eight met death as a result of defective machines and ninety were killed as a result of their own individual deficiencies. Of these ninety, sixty deaths were due to physical defects.

As a result of this startling discovery, the British established a Care of the Flyer Service, selecting their aviators with due regard to their qualifications. As a result, at the end of the second year, their fatalities due to physical defects were reduced from sixty to twenty, and, at the end of the third year, from twenty to twelve.[3]

After the war, research into the medical problems of aviation increased tremendously.

Now, practically every country has a physical standard for air pilots. From this research work has arisen a new medical specialty known as aviation medicine. This involves a knowledge of physiology and medicine, of ophthalmology and otology, of psychology, neurology and psychiatry.

Since the war, aviation in the United States has progressed by leaps and bounds. Passenger and mail lines have made an intricate network in all directions. Privately owned planes have become comparatively numerous. In order to supervise civilian flying, the Department of Commerce, through its Aeronautics Division, has assumed control and promulgated rules and regulations governing it. Pilots and mechanics must be examined and certified as to their fitness. Planes must have the official seal of approval.

Civilian pilots are divided into five classes, viz.: student, private, industrial, limited commercial, and transport. There are three classes of physical examination, as follows: One for transport and limited commercial pilots, one for industrial pilots, and one for private pilots. The student pilot is required to take the private pilot examination.

Examiners should remember that the applicant, as a rule, is not ill. He does not complain, as does the ordinary patient. Therefore, it becomes the duty of the examiner to seek those defects that disqualify. He should impress upon the candidate that the examination is a protection to him, as well as to the public. If he is not fit to fly, surely he wishes to know it.

Regulations require that a candidate for flying honors shall be in perfect physical condition. His past history is carefully investigated with a view to determining the presence of any disease such as tuberculosis, syphilis, malaria, and asthma, that are disqualifying for obvious reasons. The presence of hernia or ankylosis of the arm or leg joints likewise disqualifies, as the amount of muscular effort in handling the controls on the large transport planes calls for free joint action and might cause strangulation of an existing hernia. Of course, all acute conditions disquilify until they subside.

Regarding the cardio-vascular system, particular attention must be paid to the blood pressure and the pulse rate, and their reaction to exercise. It has been found that candidates with moderately high blood pressure are better risks than those with low blood pressure, that is, with a systolic pressure of 100 or thereabouts. The latter class does not stand altitude nor the stress of flying. Many of them have vaso-motor instability expressed by profuse sweating, cold blue hands and feet, and a lowered systolic pressure after exercise. The examiner must be prepared to distinguish between the nervous elevation of blood pressure seen in applicants undergoing their first physical examination and the genuine increase due to organic trouble. The former usually disappears if the candidate is assured that his examination is proceeding satisfactorily, or if he is allowed to return, in a day or so, for further test. The pulse rate after exercise, such as hopping fifty times on one foot, ought to return to approximately normal or a few beats higher in two minutes.

Now we come to one of the two important parts of the examination—the eye and ear. Transport pilots are the custodians of the lives of the passengers they carry. Eternal vigilance must be theirs, not only straight ahead, but peripherally. Visual acuity must be perfect. As Bauer[1] says:

> Visual fields must be determined not only for form but for color, as restricted visual fields or scotomata may mean either beginning blindness or interference with night vision. He must detect navigating, airdrome, and signal panels; his map is printed in colors and the different shades of green and brown on the ground indicate the character of the terrain over which he is flying.

His ability to judge distance and depth must be within certain limits. The requirements for industrial, private, and student pilots, regarding visual acuity, are not so stringent as in the case of transport pilots, but nevertheless, if any flyer in these classes has not perfect vision, it must be corrected to normal with lenses before he can fly.

Hearing is not of particular importance in flyers. As long as the pilot can hear the functioning of his motor and the starting instructions of his mechanic, he can get along. Most pilots, flying more or less continuously, eventually become deaf from the constant roar of the motor. However, it is necessary that he have good hearing to start with, as, when he becomes deaf, unless he is a very experienced flyer, he is out of the game. Therefore, anything that might interfere with his hearing, such as chronic throat infection, closed Eustachian tubes, and so forth, should be remedied.

Of much more importance is equilibrium. Reams and reams have been written on the part the vestibular apparatus plays in maintaining equilibrium. The flyer is constantly changing his level. While he is flying in a clear atmosphere, he can regulate his machine through his eyes, but if he is going through clouds, he must depend on his deep muscle sense and his instruments.

Pilots flying through clouds or fog for some distance frequently find themselves very far from the level when they emerge; may even be up-side-down. Experiments at the Medical Research Laboratory of the Army seemed to prove that many normal individuals, when blindfolded, were unable to sense accurately the direction of even the more rapid and violent movements in stunting.

The deep muscle sense is difficult to test or define, but the pilot lays great stress on the pressure against his seat, the visceral sensations and other gravity effects. Combined with this is the tonic influence of the vestibular apparatus. O'Reilly[8] says:

> It would seem that the semi-automatic maintenance of aerial equilibrium depends not on the information derived from any one set of peripheral sense organs, but on the correct interpretation of afferent stimuli arriving at the cerebral centres from widely different sources, their correlation and proper utilization in conjunction with the sense of judgment resulting from the pilot's experience.

The second most important part of the examination is the neuro-psychiatric investigation, with which is closely allied the personality study. Not only should the psychotic and epileptic be detected, but also the psychoneurotic and epileptoid, the first two classes for obvious reasons, and the others from the fact that these conditions show definite nervous instability. Close questioning serves to show the applicant's reactions to mental and physical stresses in childhood, school life, sex matters, business and family affairs. Through this it is possible to eliminate the candidate who goes to pieces in an emergency or the one whose reaction to stresses is so slow as to be of little or no use. As Longacre says,

> The examination, to make a satisfactory forecast of the flyer's reactions to flying, must reveal latent tendencies which under the stress of flying might become so accentuated as to make him inefficient and lead to mental and nervous breakdown; or, on the other hand, make clear such stability of organization as will be proof against stresses admittedly exceptional and foreign to average experience. It is not conceded that nature has at last achieved her highest objective and in the flyer produces a superman. It is, however, required that he be equal to the requirements of the situation, usual or unusual, and with respect to the unusual, be capable of the instantaneous and correct response demanded by the emergency.

This is a brief resume of the safeguards elaborated by the Department of Commerce, not only to protect the public, but also the embryo flyer from himself and his physical defects. The examination, to be worth anything, must be meticulously carried out. This medical safeguarding does not cease with the entry of the pilot into the service. The transport and limited commercial pilots are examined every six months and the other classes yearly. Many of the large transport companies appreciate the value of periodical examinations and have their pilots examined monthly. The pilot's greatest bugaboo is "staleness", expressed by exaggerated reflexes, tired feeling, fast pulse and lowered blood pressure.

As a result of these regulations, many of the irresponsible, reckless pilots have been eliminated. Some, I regret to say, have been stricken from the list by death, the result of their own daredeviltries. The Great World War bred many of these, whose motto was, "Eat, drink, and be merry, for tomorrow we die." Nowadays, the transport pilots are a sober, serious-minded body of men, brave without being reckless. Night and day, through sunshine and storm, without heroics, they guide their planes with their precious human freight, realizing fully the enormous responsibility that rests upon them. When an emergency confronts them, they are cool and collected, and if a fatal issue ensues, the pilot will be found to have gone down with his ship, faithful to the end. If the pilot comes out alive, he sacrifices his own comfort to the safety of his passengers or mail, makes every effort to get in touch with outside assistance.

We have all heard of the terse report of the railroad man: "Off again, on again, gone again, Finnegan." The classic of the air mail service is the laconic report sent by Dean Smith: "Dead stick—flying low—only landing on cow—killed cow—wrecked plane—scared me. Smith."

Now let us see what effect these precautions have had on the accident rate. The report of the Accident Board of the Aeronautics Division for the first six months of 1931 deals principally with transport flying. During this period there were five fatal accidents of which three were passengers, in more than twenty million miles of scheduled flying. As compared with the corresponding period of 1930, the passenger miles flown per passenger fatality showed an increase of more than one hundred per cent. In the first six months of 1930, the miles flown per passenger fatality were 2,375,664; in the first six months of 1931, the passenger miles flown per passenger fatality were 5,277,989. This was due to an increase in the number of miles flown accompanied by a decrease in the number of passenger fatalities.

It is difficult to compare the statistics of motor car fatalities with those of airplane travel, but when we learn that 32,000 people were killed and 960,000 injured in auto travel in 1930, we must confess that, in the matter

of accidents, airplane travel compares most favorably.

In motor bus travel there has been a fatality in every 2,523,315 miles, and an injury in every 27,111 miles traveled. Compared with the statistics of airplane travel, the fatality rate is nearly twice as much as by airplane travel.

This country is covered with an intricate network of airplane routes, making 160,000 miles a day, and travel thereby is becoming increasingly popular. Many of us, I hope, will live to see the day when airplanes will be almost as common as motor cars are now.

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ROENTGEN EXAMINATION OF THE GASTRO-INTESTINAL TRACT

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(Read before the New Mexico Medical Society, at its Forty-ninth Annual Meeting at Albuquerque, N. M., May 20-22, 1931.)

Since Roentgen's discovery there has been an increasing value in the use of x-rays in diagnostic procedures. This is probably most marked in the roentgen studies of the gastro-intestinal tract. Improvement in mechanical equipment, better tubes, and faster intensifying screens, have been a stimulus to the roentgenologist to supplement routine x-ray studies with more detailed observation of certain regions under suspicion. Just as important a stimulus to more accurate studies has been the change of attitude on the part of the general medical profession toward the roentgenologist. He is no longer regarded as a medical technician to whom patients are sent for a series of films, or for this or that routine procedure, but as a clinical consultant who proves to be very helpful in making many clinical diagnoses.

The feeling that a series of good films and an interpretation of average intelligence will always produce a diagnosis which absolutely checks with clinical findings has disappeared. While many pathological entities offer a characteristic roentgen appearance and while it is amusing to make snap diagnosis from first inspection, it is now quite generally felt that the roentgen examination should entail a consideration of the clinical findings, to arrive at an accurate interpretation. Having been given a summary of the clinical and laboratory studies, it is often possible for the roentgenologist to offer helpful suggestions as to the choice of roentgen studies. This is of two-fold value: it may eliminate unnecessary procedures, and at the same time holds down the cost of examination; also, supplementary procedures can be used to advantage during the period of study. For example—if the problem is to differentiate a diseased gallbladder from duodenal ulcer, it is preferable to do the gallbladder studies first; or if a lesion is suspected in the large bowel, it is preferable to study with a barium enema. The latter remark may sound quite unnecessary, but for some reason clinicians usually request a gastro-intestinal series whenever they wish to check pathology somewhere in the gastro-intestinal tract. In many cases a study and examination of the large bowel will not only suffice but will lead to an early arrival at clinical diagnosis. Lack of thought in choosing the proper x-ray procedure often fills a gastro-intestinal tract with barium which is not evacuated for weeks. Of course, many cases are clinically obscure and therefore it is frequently desirable to use every type of study available to visualize the gastro-intestinal tract.

The following case is a common example of the type which should have been started with a study of the lower bowel. Mr. G., a male of 68, was admitted complaining of constipation, rectal pain and a loss of fifteen pounds in six months. A barium meal series revealed a normal gastro-intestinal tract above the sigmoid, at which point an almost complete obstruction was encountered. The case was necessarily followed for days before the stenosing tract could be visualized and even after three weeks the colon still contained barium. After a few days' observation, a low barium enema was given and a stenotic filling defect seen. Sigmoidoscopy revealed a rather extensive carcinoma at the site of obstruction, (figure 1).

The next case is an example of one in which, even with careful clinical examination, it is impossible even vaguely to localize the lesion, This is the type of case in which close cooperation between the roentgenologist and clinician is essential to arrive at a correct diagnosis. Mrs. T., a female Mexican of 44 years, complains of pain in her arms and legs, general weakness, with some loss of weight. She presents no remarkable physical findings and there was some difficulty in obtaining a history from her. It is because

of such patients who present meager physical findings and indefinite clinical histories that the clinician wishes to insure himself against the presence of a possible malignant

Figure 1. Case 2. Showing defect in sigmoid and marked retention of barium.

lesion. A barium meal series in the case of this patient showed a normal stomach and cap, a normal five-hour distribution and a normal distribution at 24 hours. Because of a very questionable irregular contour in the sigmoid region, a barium enema was given, revealing an extensive filling defect in the upper sigmoid, which offered all the characteristics of carcinoma, (figures 2 and 3).

It is, of course, desirable to recognize these lesions in their earliest stages. As, in this case, the lesion offered no obstruction to the ingested barium, it is perfectly possible to obtain negative findings at the 24-hour examination. Unless sufficient barium is present in or about a diseased portion of colon it is impossible to visualize this region.

It would be ideal, of course, to have complete barium meal and enema studies in all patients, but, while this is carried out in some clinics, it is not generally possible. By giving the roentgenologist your clinical impressions and findings and cooperating with him in regard to rechecking questionable roentgen findings, many possible errors will be avoided. In closely organized clinical groups, it is easy for a roentgenologist to obtain enough personal contacts with clinicians to get satisfactory roentgen studies. Most roentgenologists, however, do a large part

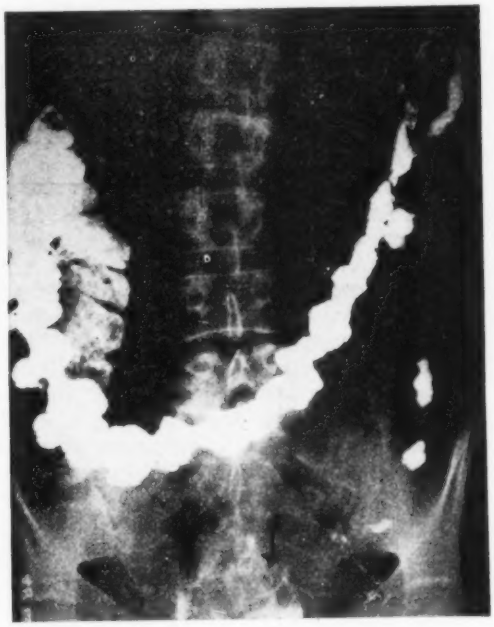

Figure 2. Case 2. Film forty-eight hours after barium, showing very slight irregularities in region of sigmoid.

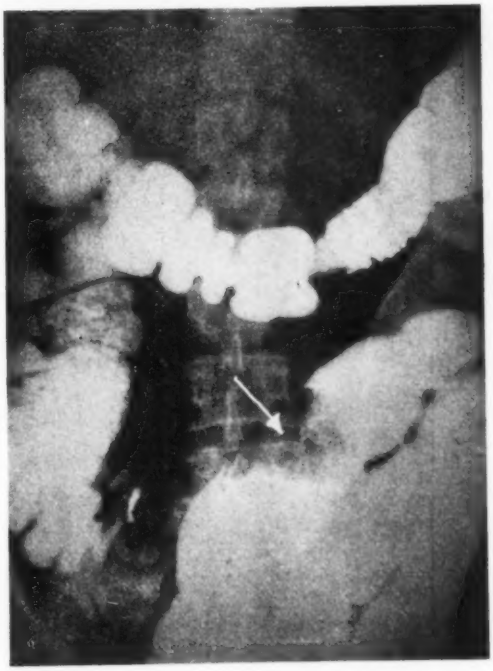

Figure 3. Case 2. Same colon with barium enema showing extensive defect.

of their work in private offices and it is frequently quite difficult to get in touch with individual physicians. Occasionally the roentgenologist will lead the clinician astray. curate and, even with a careful clinical roentgenological examination, error may occur, as many atypical vagaries present themselves in roentgen diagnosis, as in physical examination.

As an example of misleading roentgen findings, I will cite case number 3, Mrs. B., 58 years of age. Roentgen examination at 5 and 24 hours after a barium meal, showed a small fixed cecum. Its contours were rigid and deformity was fixed. With barium enema the same findings occurred. The evidence seemed to justify a roentgen opinion of an organic lesion, possibly carcinoma. Inasmuch as the patient presented clinical evidence consistent with neoplasm—loss of weight, constipation and weakness—an exploratory operation was done. Except for a few adhesions about the tip of the cecum, surgical findings were normal. The cecum was soft, pliable, and offered no evidence of infiltrating lesion (figure 4).

Figure 4. Case 3. Showing small deformed cecum.

The next case illustrates a different type of diagnostic error. Mrs. S., a female of 51 years, was admitted complaining of weakness, loss of appetite, and a loss of thirty pounds in the past three months. A week before admission the patient had several small bloody stools associted with mild diarrhea. She vomited several times. The barium meal series showed a large filling defect in the ileocecal region and a mass surrounding the narrowed barium stream. A

Figure 5. Case 4. Five hours after barium meal.

Figure 6. Case 4. Twenty-four hours after barium meal. Note characteristic distribution of barium through intussuscepted bowel.

summary of the roentgen findings concluded that the changes presented a typical evidence of new growth. At operation the surgical report was: "Fairly large, freely movable carcinomatous mass involving the cecum and ascending colon. Some retroperitoneal glands were felt. Anastomosis of the terminal ileum to transverse colon was done, isolating the cecum and ascending colon. Mass considered resectable and second stage will be done later." The patient died several days later. At postmortem examination: "A round polypoid mass measuring 6 cm. in diameter was found on opening the cecum. This had the external appearance of normal cecal mucosa and was directly overlying the ileocecal valve. On section of this mass the ileum was seen to open directly into its mid portion and was invaginated. Sections of this region showed small round cells and sparse connective tissue. These cells varied in staining reaction and here and there many mitotic figures can be seen. One place shows intestinal mucosa that is degenerated into the same type as described above." Diagnosis: Intussuscention with lymphosarcoma. (Figures 5, 6, 7, 8). The error in diagnosis here was a clear case of misinterpretation on my part, due to ignorance of the occurrence and appearance of chronic intussuscention in adults. It was rather inexcusable, as the roentgen picture was perfectly comparable to the more common similar condition in children.

Figure 7. Case 4. After barium enema.

Figure 8. Case 4. After evacuation of barium enema

Case 5. Female, 72 years old. Admission complaints: obesity, constipation, and rheumatism. History was negative for trauma. Cholecystectomy at 52. Nine mnormal pregnancies. During orthodiagraphic study, a

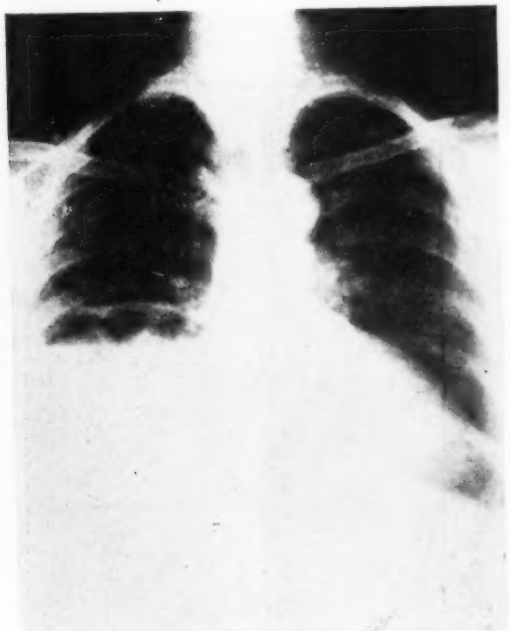

Figure 9. Case 5. Showing dense shadow in lower right chest. Note air-filled loops of bowel at upper level.

shadow was seen in the right lower chest. She was referred by Dr. Sansum to the Roentgen Department for chest study. This showed a moderate left ventricular cardiac enlargement with a dense shadow in the lower half of the right chest. The upper half of this shadow showed an air-containing viscus and, on the chance that this might represent the rather rare right-sided type of diaphragmatic hernia, a barium meal was given. As shown in figure 10, the follow-up examination revealed the entire hepatic flexure and much of the transverse colon was visualized in the right thorax extending up to the level of the second rib anteriorly. No evidence of diaphragmatic septa was found.

Figure 10. Case 5. Twenty-four hours after barium meal.

Figure 11. Subphrenic abscess. Note similarity to Case 5.

CONCLUSIONS

The above remarks and cases are presented to show the need for close cooperation between roentgenologist and referring clinician. Several types of possible errors have been considered and it is hoped that their illustration and discussion may prevent others from making similar misinterpretations.

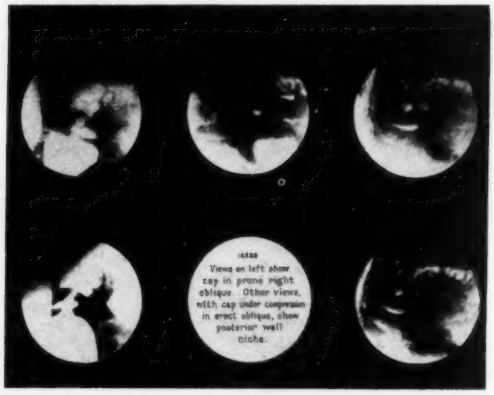
Views on left show cap in prone right oblique. Other views, with cap under compression in erect oblique, show posterior wall niche.

Figure 12. Duodenal ulcer with visualized niche.

As we have the good fortune of hearing Dr. Hunt discuss the surgery of gastroduodenal ulcer this afternoon I thought it might be of interest to present briefly an abstract of a roentgen study of these lesions.

This study comprises an evaluation of the so-called compression technic, which has become quite popular in the European school. Although not in general use, the method has been well described, particularly by Chaoul, Akgerlund, Berg, and Albrecht. Briefly, it consists of localized compression over the duodenum or the part of the stomach under examination, under fluoroscopic observation, and the projection of this picture on films. The object is to obtain a detailed study of the our diagnostic accuracy but will be of particular value in demonstrating lesions with such detail that their response to treatment can be followed with accuracy.

It is also applicable to other parts of the gastro-intestinal tract, particularly in the

duodenum or stomach with just sufficient barium to coat the mucosal surfaces. As a result of this procedure, lesions are demonstrated more clearly. The most certain and important sign of ulcer, the niche, can be visualized in as high as 50 per cent of cases which present bulb deformities characteristic of ulcer. Also, certain superficial mucosal ulcerations and the en face type of niche can be shown with great detail and certainty, whereas they might justifiably be missed by even a careful roentgen study which did not involve the use of this technic.

Figure 13. Upper views made in right oblique position. Lower views made with cap under compression.

Compression has always been a part of a careful fluoroscopic examination, obtained either digitally or by mechanical means. In this study a compressor diaphragm designed by Akerlund, and a canvas belt with small rubber bulb designed by Chaoul, were used as compressors.

I believe the method will not only increase visualization of the gastrojejunal stoma and in the colon, where it is desirable to visualize positions of mucosal surfaces which may contain localized organic lesions.

This study will be reported more completely in a later communication.

DISCUSSION

DR. CURTICE ROSSER, Dallas, Texas: I cneveryone here did also. It certainly is very comjoyed Dr. Geyman's paper very much and am sure mendable for a man to report his errors these days, though I realize Dr. Geyman probably had to go away back in his old files to get sufficient examples of this sort to make it interesting.

I have only one suggestion to make and that is that the proctoscopic examination be made before the oral administration of barium, as barium will cake up, get mixed with the stool, and sticks more or less, thus rendering the examination difficult.

DR. VERNE C. HUNT, Los Angeles, Cal.: Dr. Geyman's paper is a very excellent one. His recent observations in this newer method of eliciting the x-ray findings, particularly the niche in duodenal ulcer, is very gratifying, and the method he has presented is a very important step in the aid of diagnosis.

DR. GEYMAN had nothing to add in closing discussion, but thanked Dr. Rosser and Dr. Hunt for their remarks.

THE SURGICAL TREATMENT OF PEPTIC ULCER

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Los Angeles, California

(Read before the meeting of the New Mexico Medical Society, Albuquerque, N. M., May 20-22, 1931.)

Generally speaking, the term peptic ulcer is applied to ulcer occurring in the duodenum, stomach, or jejunum, and strictly speaking it is a misnomer, for in no wise are these ulcers similar. They differ materially in their response to treatment. The surgical procedure of choice for ulcer depends largely on whether the lesion is duodenal, gastric, marginal or jejunal.

The results following surgical treatment of duodenal and gastric ulcers are best when care is exercised in the selection of cases, and when the indications for surgery are most definite. Repeated hemorrhage, perforation, obstruction, or gastric retention resulting from duodenal ulcer, represent more or less urgent indications for surgical treatment. Disability and inefficacy of medical management comprise indications for surgery which cannot be disregarded. Many cases of duodenal ulcer of short duration will respond to medical treatment. Many others, where symptoms are sufficiently mild to produce little if any disability on medical and dietary management, are not surgical. There are definite specific indications for medical treatment. However, to conduct and prolong ineffectual medical treatment in cases possessing definite and unmistakable surgical indications, not only postpones the benefits to be derived from surgical intervention, but often allows the patients to become a poor surgical risk. In general, it may be stated that approximately 50 per cent of duodenal ulcers become surgical.

Surgeons are very prone and properly so, to regard most gastric ulcers as surgical in the absence of contraindications to operation. Un, questionably many gastric ulcers will heal under proper medical management, but the relationship between gastric ulcer and carcinoma of the stomach cannot be denied. Whether or not there is any degree of agreement between surgeons, internists, and pathologists, regarding the incidence of carcinoma developing upon an old gastric ulcer, it must be re-

cognized that the clinical differential diagnosis between benign gastric ulcer and early carcinoma is not always easy and accurate. There are many lesions of the stomach, as determined by clinical and roentgen-ray examination, where only exploration and microscopic section will determine the accurate diagnosis. The therapeutic test of differentiation has at times allowed an operable lesion to become inoperable during the period of observation. I repeat that, even though some gastric ulcers respond to medical management, most gastric ulcers, by virtue of their actual and potential pathology, in the absence of contraindications, are surgical lesions. Likewise, it has not been my good fortune to observe permanent benefit from medical and dietary management of marginal and jejunal ulcers when they occur. Their persistence under medical management has frequently resulted in hemorrhage, perforation, and gastropepunal-colic fistula.

The most satisfactory results incident to the surgical treatment of duodenal ulcer are those following posterior gastro-enterostomy for varying degrees of pyloric obstruction. These excellent results led to the deduction that, if gastro-enterostomy produced satisfactory results when obstruction occurred secondary to duodenal ulcer, the same procedure should produce similar results when used in non-obstructive types of duodenal ulcer. Experience has proved such conclusions not well founded.

Although the technical procedure of gastro-enterostomy has been standardized, its indications have not always been adhered to. The operation of gastro-enterostomy provides excellent results in 88 to 90 per cent of cases when technically and accurately performed in the presence of true indications for surgical treatment of duodenal ulcer. The procedure fails to provide satisfactory results in cases unsuited to such procedure. It fails because it is at times still performed on the suspicion instead of the demonstration of an ulcer. It fails through the persistence of foci of infection or other probable causes of ulcer, or because of individual susceptibility in a small percentage of cases to recurrence of ulcer; through faulty technic, particularly undue trauma, which certainly must be a factor in the causation of marginal or jejunal ulcer; and also fails through early postoperative indiscretions. The unsatisfactory results that occasionally occurred following gastro-enterostomy led to the development of the direct operations, which, for the most part, have a limited field of usefulness.

The direct operation of excision of duodenal ulcer should provide a high percentage of good results, and is a procedure particularly applicable to the bleeding type of duodenal ulcer. Unfortunately, in many cases in which hemorrhage has been a predominating symptom, there is so much inflammatory reaction about the ulcer in the acute and subacute lesions, or so much scarring in many of the chronic lesions, that the indirect operation of gastro-enterostomy becomes the procedure of necessity. Also, the direct operation is not always applicable to the lesions on the posterior wall of the duodenum. The indirect operation of gastro-enterostomy has been successful in controlling the symptom of bleeding in about 50 per cent of the cases of bleeding duodenal ulcers. The direct operation of partial duodenectomy described by Judd has, when applicable, afforded greater assurance against recurrence of bleeding than any other type of surgical procedure.

Experience in recent years has shown that the results of simple excision of duodenal ulcer have not been as satisfactory as those in which some type of pyloroplasty has been done in addition to local excision of the ulcer. The Heineke-Mickuliez, the Horsley, and Finney operations have had to do with the division of the pylorus, with varying results. Horsley recently reported but 45 per cent satisfactory results following his operation, failure having been due in most of the remaining cases to recurring ulcer along the pyloroplasty incision. Judd has not only divided the pyloric sphincter, but has excised the greater part of the sphincter, making a gastroduodenostomy, converting the stomach and duodenum into one continuous tract, thereby producing about the same physiologic changes that occur in cases in which gastro-enterostomy is performed. This operation has been done with a mortality rate of less than one-half of one per cent, and has provided results comparable to the best results following gastro-enterostomy in carefully selected cases. There are, however, certain limitations to the direct operation of excision and partial duodenectomy.

The indirect operation of gastro-enterostomy has given better results when used in cases of old chronic duodenal ulcer, with or without obstruction, than when employed in those cases of relatively short duration, and particularly in young people. It has a higher percentage of applicability than any of the direct operations; and few, if any, of the direct operations, even though applied in carefully selected cases, have been productive of the results derived from gastro-enterostomy. Even though gastrojejunal or jejunal ulcer does occur following gastro-enterostomy, and has been credited with failure to

obtain a satisfactory result following gastro-enterostomy in 3 to 30 per cent of the cases, a low incidence is the rule, and quite probably the true incidence is within 5 per cent. Failure to remove associated disease in the appendix and gallbladder, and the persistence of associated organic disease outside of the stomach and duodenum, are unquestionably responsible in no small measure for incomplete relief following the conservative operations for duodenal and gastric ulcer. The radical operation of partial gastrectomy has little if any place as a primary procedure in the surgical treatment of duodenal ulcer. The direct and indirect operations are performed with a mortality rate approximating 2 per cent. In the last 635 cases of duodenal ulcer operated upon on my surgical service at the Mayo Clinic, there were fifteen deaths, a mortality rate of 2.3 per cent. The average mortality rate of partial gastrectomy is certainly no less than 10 per cent, and recently Hartwell and Felter have reported a mortality rate as high as 36 per cent for this procedure in duodenal ulcer. Primary partial gastrectomy for duodenal ulcer affords little, if any, more assurance against recurrence of ulcer than do the conservative procedures and no one has yet, to my knowledge, reported results following this radical procedure which surpass those obtained through conservative procedures. Partial gastrectomy is at times necessary as a secondary operation for persistence of bleeding after gastro-enterostomy and, in the absence of a marginal ulcer, such partial gastrectomy may be done with excellent prospects of cure and a minimum risk by by preserving the gastro-enterostomy and completing the procedure as a Billroth No. II. The results are so excellent and the risk so small following gastro-enterostomy or the direct operation of excision, with resection of the pyloric sphincter, in the surgical treatment of duodenal ulcer, that the radical operation of partial gastrectomy should be reserved as a secondary procedure, when necessary, for persistent bleeding or recurrence of ulcer.

The problems associated with the surgical treatment of gastric ulcer are considerably more complex than those in duodenal ulcer. The benignancy of duodenal ulcer is practically absolute, and rarely is primary malignancy of the duodenum encountered. Whether or not any relationship exists between gastric ulcer and malignancy developing upon an old gastric ulcer, is a question of great importance and one regarding which there is still considerable controversy. It is quite probable that most gastric carcinomas are malignant lesions from their inception. However, there is much evidence in support of the opinion that gastric ulcer has been the forerunner and has provided the cellular changes which subsequently constitute a true malignant lesion in some cases. The chief problem relates to the differential diagnosis between gastric ulcer and early operable carcinoma, which frequently may be accurately established only through surgical exploration and microscopic section.

To establish the accuracy of diagnosis by such methods necessitates excision of the lesion, which may be accomplished by relatively conservative or radical procedures. For true gastric ulcer, the conservative procedures are usually the ones of choice, reserving the radical procedure of partial gastrectomy for those lesions not suitable for conservative surgery. While the direct operation of excision is highly desirable, the acuteness of the lesion, extensive inflammatory reaction associated with protective perforation or inaccessibility of the ulcer through its high situation in the posterior wall of the stomach, may make only a gastro-enterostomy applicable. In a series of 123 cases of gastric ulcer I performed a simple gastro-enterostomy in 22 per cent of the cases. Balfour has recently reported a mortality rate of 3 per cent and 70 per cent satisfactory results in 100 cases of gastric ulcer in which gastro-enterostomy only had been done.

The incidence of obstruction is high in gastric ulcer situated near the pylorus. However, gastric retention of high degree is frequently noted when the ulcer is situated well away from the pylorus, and in most instances is not due to mechanical obstruction but to disturbance of gastric motility through loss of continuity of gastric musculature. In very few cases of surgical gastric ulcer may a good result be expected following simple excision of the lesion, unless it is for ulcer in the cardiac third of the stomach. Some degree of retention, with delayed emptying of the stomach, may persist after simple excision through continued disturbance of gastric motility, and to obtain the best results from conservative excision, the indirect operation of gastro-enterostomy must supplement it. Cautery excision of the entire lesion has proved a most satisfactory procedure when combined with gastro-enterostomy. It is accomplished with a low mortality rate and followed by excellent results.

Conservative excision of the lesion, with gastro-enterostomy in all but four cases, was the method employed in 77 per cent of the direct operations in my series of gastric ulcer. Some type of resection was used in the remainder, with the exception of four cases in

which there had been acute perforation. Partial gastrectomy, after the method of Polya, was most frequently employed. The Billroth No. II was the final procedure in two cases in which a resection was done as the second stage of a two-stage operation, a posterior gastro-enterostomy having been previously made. There are certain cases in which the two-stage operation is to be recommended, particularly in patients in poor general condition, and in cases in which the one-stage excision of a large perforating lesion would be accompanied by an unjustifiable risk. The Billroth No. I and the sleeve resection have a very limited field of usefulness. The latter procedure is particularly suited to the hour-glass deformity occasionally encountered in gastric ulcer. However, recurrence as an anastomotic ulcer in the suture line, with recurrent hour-glass deformity, is not infrequent. Just recently, I have performed a partial gastrectomy for such a recurrence.

The choice of surgical procedure depends largely upon the size and location of the lesion and upon whether or not perforation has occurred. To disturb the protection afforded by the liver, pancreas, or gastroheptatic omentum in the presence of a large subacute perforating ulcer with much surrounding inflammatory reaction, contributes greatly to the risk of any direct operation. On the other hand, many small or medium-sized ulcers that have gone on to perforation, with subsidence of the subacute inflammatory process, and have assumed the characteristics of a chronic perforated lesion, may be readily excised. Partial gastrectomy may be the procedure best suited to certain gastric ulcers, but the conservative procedure of cautery excision of the lesion and posterior gastro-enterostomy is applicable in a high percentage of cases. It assure psparoximately as good a result as a partial gastrectomy and it is accomplished with less risk.

The postoperative development of marginal or gastrojejunal or jejunal ulcer has mitigated considerably in the past in condemning the conservative procedures in the surgical treatment of gastric and duodenal ulcers where gastroenterostomy has been employed as an indirect operation for dundenal ulcer, and when used in conjunction with excision of gastric ulcer. The high incidence of marginal or jejunal ulcer following gastro-enterostomy, as reported by the advocates of radical partial gastrectomy, provides insufficient grounds upon which these conservative procedures may be discarded in favor of the more radical and certainly more hazardous procedure of partial gastrectomy for these benign lesions of the stomach and duodenum. While the incidence of marginal and jejunal ulcer has been reported as from 3 to 30 per cent, the true incidence is probably not more than 5 per cent, and, while such lesions are responsible for failure of gastro-enterostomy, the same complication accounts for failure following partial gastrectomy in a definite percentage of cases, which fact cannot be disregarded. When marginal or jejunal ulcer does develop subsequent to gastro-enterostomy, one may retract his steps and restore the continuity of the gastro-intestinal tract as a secondary procedure, or resort to partial gastrectomy when necessary. Secondary operations for marginal or jejunal ulcers developing subsequent to partial gastrectomy are of necessity hazardous and radical.

In recent years, there has been a tendency to employ the radical operation of partial gastrectomy for gastrojejunal or marginal ulcer. However, even though partial gastrectomy becomes the procedure of necessity in certain instances, the relatively high incidence of recurrence of ulcer following such radical procedure has served to curb enthusiasm for partial gastrectomy and has instituted a reversion to the more conservative procedures formerly used most satisfactorily. Of these procedures, taking down the gastro-enterostomy and excising the marginal ulcer, with restoration of the continuity of the gastro-intestinal tract and some type of pyloroplasty, has been the procedure of choice, and is again being properly returned to that position. Its usefulness is limited to those cases in which the duodenum and pylorus can be mobilized, and to those cases in which, as a result of the original duodenal ulcer, there is not sufficient scarring and contraction to preclude some type of pyloroplasty. Partial duodenectomy and gastroduodenostomy, after the method described by Judd, has proved a most satisfactory type of operation to employ in conjunction with excision of the marginal ulcer and taking down of the gastro-enterostomy when the duodenum can be mobilized. In those coses in which the duodenum and pylorus are not readily accessible, some type of gastric resection usually must be resorted to. When gastrojejunal-colic fistula, fortunately of infrequent occurrence, has complicated a marginal or jejunal ulcer, the general condition of the patient is such that radical operations are not well tolerated, and here again the most simple surgical procedures are necessary to conservation of life.

I should like to leave with you the idea that the treatment of peptic ulcer requires differentiation as to whether the lesion is

duodenal, gastric, marginal or jejunal. Uncomplicated duodenal ulcer often responds to medical management. Failure of response to such treatment, repeated hemorrhage, pyloric obstruction, or perforatioon, represent true indications for the institution of surgical procedures, among which the operation of partial gastrectomy has no place as a primary operation. Most gastric ulcers, by virtue of their actual and potential pathology, in the absence of contraindications to operation, are surgical lesions, and, while partial gastrectomy is at times the most readily applicable procedure, conservative surgical excision and the indirect operation of gastro-enterostomy is readily done in the majority of instances. The indications for surgical treatment of peptic ulcer must always be sufficiently definite to justify the risk and the mortality rate attending any surgical procedure. The consciousness that surgical mortality follows a wilful procedure of the surgeon's own hand must deter him from the performance of radical, dangerous, partial gastrectomy as a primary operation in the surgical treatment of duodenal and most gastric ulcers.

DISCUSSION

DR. F. D. VICKERS, Deming, N. M.: I have enjoyed Dr. Hunt's paper immensely and should like to ask him if duodenal ulcers that recur and then apparently show no symptoms for months have healed up entirely, or if they are still ulcers.

DR. P. RICHARDS, Albuquerque, N. M.: This is rather a comprehensive subject and I do not believe that differential points between a peptic ulcer and a duodenal ulcer should be discussed in the same paper. A peptic ulcer is always invariably an embryonic process while duodenal ulcers are a mechanical proposition. I have never seen a true peptic ulcer cured, nor have I ever seen a true duodenal ulcer cured. I have seen duodenal ulcers go along quiescently for years if the patient has learned to sleep on his stomach, but they usually recur sooner or later.

DR. NATHANIEL H. BRUSH, Santa Barbara, Cal.: I have become more and more convinced as time goes on that certain tendencies, certain situations play an enormous role in the formation of duodenal ulcers and also gastric ulcers. For the past year I have been working very largely on problems of the psychiatric treatment of colitis and have collected somewhere around fifteen cases, a large majority of them women. Understanding and helping them to understand their problems has done a lot to help to cure these fifteen cases. They had been treated by all sorts of ways—diet, nutrition, restcures and most everything—but it was really giving the individuals a chance to understand their own difficulties, their own situations and how to handle them, that helped most to alleviate their trouble. In my own personal experience in my home, I was very much disturbed over a duodenal ulcer and had all kinds of treatment. During the height of the ulcer it was necessary for me to live under a situation of great strain and very great unpleasantness all around. As soon as this situation was removed, I became better.

DR. HUNT (closing): There are many different opinions about this whole subject. A doctor asked me about the relationship between ulcer and foci of infection, stating he had had an ulcer for years, but as soon as he got his teeth out, all symptoms disappeared. There is a very definite relationship between foci of infection and gastric ulcer. As I stated in my paper, when the diagnosis of duodenal ulcer can be made in the absence of hemorrhage, pyloric obstruction, or perforation, that patient is entitled to a thorough trial of medical treatment and many of them will respond to it. I do not propose to know a whole lot about medical treatment, except to say that various things have been done. Removal of possible foci of infection, alkalis, and other therapeutics may help this class of cases. Dr. Brush's statements, I think, are very excellent. I could not help but be reminded of some of the discussion this morning as to the incidence of high infant mortality in some sections of the country and among some people; as the doctors show, there is a very high incidence among people occupying a very social scale, which is made for them according to their income status, and as that rate increases, their immunity and resistance is increased. One of the men said that some people did not and could not take education when it came to educating the public. Now all these things should be taken into consideration and, when people are in such a position and such a station in life that this medical and non-surgical treatment may be instituted before surgical, many will respond. Then when surgery is contemplated, you should bear in mind the distinct surgical indications which I have attempted to enumerate in my paper. As regards the healing of ulcers, we know that many ulcers heal. Frequently autopsy records will show other conditions as the cause of death, yet old healed ulcers will also be found, with no past history or reference made to such a condition having existed. I wish to express my sincere pleasure at being with you and thank you for the discussion and interest accorded my paper.

RESISTANCE AND IMMUNITY TO ANIMAL INFECTIONS

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(Read before the New Mexico Medical Society at its Forty-Ninth Annual Meeting, at Albuquerque, N. M., May 20-22, 1931.)

Immunity or resistance to animal parasites is a question which has been the subject of much experiment and speculation in recent years. Until recently, most of the work on immunity to disease has been done in connection with bacteria. It has been known centuries that, after a man or animal had recovered from certain diseases, he was thereafter immune to that disease: for ages the Chinese have practised inoculation of their children from mild smallpox cases rather than risk their exposure during destructive epidemics. Pasteur, in the last half of the nineteenth century, put the matter on a more scientific basis, and in the half century since then, there has grown up the science of immunology. It is worth noting, however, that, although we know a great deal about the canges which bacterial infections induce in the nature and behavior of the blood, we are still almost as much at sea

as ever as to how the changes are brought about. A number of ingenious theories have been advanced by Ehrlich, Bordet, Metchnikoff, and others, but none of them have satisfactorily explained all the facts. We know that the presence of foreign proteins or antigens in the body results in the ability of the blood, under certain circumstances, to dissolve them if they are not already in solution; to cause them to clump or agglutinate if in discrete particles, or to precipitate them as solid particles if they are in solution; to fix or use up a constituent of the blood known as complement, necessary for the dissolution of cellular antigens, but occurring whenever an antigen and antibody combine; to stimulate the leukocytes to a heightened appetite for them, and to increase their digestibility for the leukocytes.

We also know that, under certain circumstances, the body is rendered immune to injury by them, while, in other circumstances, it is rendered highly susceptible to them when it was unharmed by them before, a condition known as anaphylaxis. We also know that, when an animal is in a state of hypersusceptibility to a particular protein, injection of that protein into the skin causes a characteristic skin reaction; such as in the tuberculin reaction, and by the injection of pollen extracts into the skin of sensitive individuals. Just how all of this is brought about is still almost as much a mystery now as it ever was and we are almost as much in the dark as to the relation, if any, of these various immune reactions to actual immunity.

Naturally, since animal parasites, as well as bacteria, are made up of proteins, they too can bring about these various reactions whenever their proteins actually get access to the blood. The blood and skin reactions mentioned above are of common occurrence and are, in some instances, of value in diagnosis. Thus, infection with the hydatid cysts of Echinococcus can be diagnosed by complement fixation, by precipitin reaction, or by a skin test, using fluid from a hydatid cyst as an antigen. Similar results are obtained with antigens prepared from achistosomes, trichinas' lung flukes, and so forth, and probably can be obtained with any worms which actually live in the blood or tissues; but worms living in the alimentary canal or bile ducts, such as ascaris, hookworm, give very uncertain and unreliable results. Strongyloides, however, burrowing into the walls of the digestive tract, is said to react well. In some protozoan infections similar reactions occur. Thus, spirochetes and trypanosomes are agglutinated by serum immune to them; in the case of the trypanosomes the process is distinguished by the term agglomeration, since the parasites do not clump together in a haphazard manner but form rosettes, all attached centrally by their posterior ends.

Blood immunized against either spirochetes or trypanosomes shows another peculiarity in that the blood platelets adhere to the parasites until the latter become laden with them. Trypanosomes also acquire the property of attaching themselves to leukocytes, even dead ones, which undoubtedly aids in the process of phagocytosis.

Acquired resistance undoubtedly plays an important part in protozoan and metazoan infections, as well as in bacterial ones. Such resistance, in the case of protozoa, usually takes the form of an antagonism to the parasites, so that they are unable to make headway and produce heavy infections; in the case of worms, it takes three different forms: (1) resistance to invasion of the parasites; (2) resistance to successful maturing of the parasites after entry; and (3) resistance to injurious toxic effects.

It is a matter of common knowledge that protozoan infections after an acute attack usually go into a chronic state in which the parasites may be few and hard to find; such a chronic state is often punctuated by relapses, due to the parasites taking advantage of a temporary weakening in the defenses of the host, as the result of fatigue, malnutrition, or other diseases.

During the chronic periods of infection, there is usually a marked resistance to superimposed infections, although these may occasionally be possible. Fresh chancres do not develop in people with latent syphilis; adults in highly malarial countries, having been infected with malaria almost since birth, cannot develop acute malaria; chronic carriers of the dysentery ameba are not subject to amebic dysentery; and so on. Taliaferro has analyzed some of the factors involved in resistance to trypanosome and malaria infections. Two quite distinct types of resistance appear, one the property of killing and dissolving the parasites, the other the property of inhibiting their reproduction. When a rat is infected with T. Lewisi, the trypanosomes at first multiply, steadily and rapidly. Gradually the rat's blood acquires the property of inhibiting reproduction, which becomes absolute by about the tenth day. About this time the blood develops another property and suddenly destroys a high percentage of the trypanosomes present, but a few, as in the similar case of relapsing fever spirochetes, physiologically alter themselves so that they are unaffected. Since, however, they cannot

reproduce, the numbers never increase to produce a relapse. Eventually, a second trypanocidal substance is produced which wipes out the majority, and usually all, of the parasites left, and the rat is thereafter uninfected and immune. The permanent immunity of rats after one infection has run its course is due to the persistence of the reproduction-inhibiting property of the blood. If a few trypanosomes are inoculated by a flea, no demonstrable infection results because the parasites are unable to multiply. Some animals, notably the guinea pig, do not seem to have this fortunate power to control trypanosomes by stopping their reproduction, but they do produce the trypanocidal substance. When a guinea pig is infected with a pathogenic trypanosome, the latter multiplies until it is very numerous in the blood. Then suddenly the trypanocidal property comes into play and most of them are wiped out. But the few remaining ones, being unchecked in their reproduction, soon produce vast numbers again, thus bringing about a relapse, until a second trypanocidal property, active against the relapse strain, again reduces them. This relapsing process goes on until finally the parasites are either all killed or the guinea pig does not bring its defensive mechanism into play soon enough, and dies with thousands of trypanosomes in its blood. A precisely similar process occurs in infestions with relapsing fever spirochetes.

Mice seem to have no power of their own either to inhibit reproduction or to kill the trypanosomes, so the latter steadily multiply until the mice die. Strangely enough, however, if mice are treated with drugs in sufficient dose to kill most but not all of the trypanosomes, the drug in some way aids the body to develop a trypanocidal antibody so that the animal is immune for some twenty days to the original "passage strain" of trypanosomes. The surviving ones, however, are immunologically altered just as they are after a crisis in guinea pigs, and bring about a relapse. Ritz, in 1914, partially cured a mouse twenty times, with the production of seventeen immunologically different strains. In different mice these do not recur in the same sequence, and an earlier strain might reappear subsequently.

Taliaferro and Johnson have found that a peculiar relation exists between the number of trypanosomes and the trypanocidal effectiveness of an immune serum in different quantities. With small numbers of parasites, any dose above a certain minimum one destroys the trypanosomes; with moderate numbers of parasites, there are zones of effectiveness, so that doses four to ten times the minimum might have no effect, while one six times the minimum is again effective; while, with very large numbers of parasites, the serum is ineffective in any dose.

In malaria infections there is no reproduction-inhibiting mechanism present, yet the parasites are soon largely destroyed by a crisis, and are thereafter few in number. The basis for this destruction seems to lie in phagocytosis by the reticulo-endothelial system.

In metazoan parasites, as noted above, three different types of immunity come into play. In the first place, there is evidence of resistance to invasion by forms which enter through the skin, such as hookworms and strongyloides. This is probably purely physical and is related to race and age, and apparently not to immunity acquired as the result of previous infections. Resistance to the growth to maturity of parasites, however, unquestionably does result from earlier invasions. The experiment of trying to infect three horses with schistosomes has been tried. One animal which had been infected two years before and cured, failed to acquire any worms at all, while two uninfected control animals had 10,000 and 20,000 worms respectively. A similar case has been observed in which skin maggots (cordylobia) are unable to penetrate immunized areas of the skin of a guinea pig. Such types of immunity are not unique; it is known to occur with many kinds of proteins. In the case of intestinal worms which attack the mucous membranes of the intestine, it is conceivable that a similar local immunity might develop.

Sandground (1928) found that dogs infected with strongyloides stercoralis develop a high resistance to superinfections, whether cured or not, and cats even more. This immunity evidently pertained to the intestine for in immune dogs the larvae entered the skin and passed through the blood and lungs to the trachea as readily as in non-immune dogs, yet failed to mature. He found too, that the blood itself did not contain the parasitocidal property. Sandground himself, as the result of a light and brief strongyloides infection, aprarently remained immune for at least 14 months, but at the end of 23 months he acquired an accidental infection which was still present a year later. A similar immunity is noted in the case of dogs infected with ascarid worms and hookworms. Sawyer has suggested that the equilibrium reached in hookworm-infested countries, whereby infec-

tions cease to increase with age, may be due to a similar mechanism, and the same explanation might be applicable to the decreasing rate of reinfection after treatment.

It is a well-known fact that one individual may suffer severely from a dozen hookworms, while another can harbor thousands with no evident ill effects. This is a condition which is no doubt true for all worm infections. The immunity consists in the ability to neutralize toxic products absorbed from the worms, and the power to regenerate injured parts.

A slight lowering of hemoglobin results from a moderate infection and is not increased by infections twice as great. Whether hemoglobin plays an important part in immunity to parasitic infections is yet to be found. However, many factors that favor this power are known. Nutrition is of prime importance. And liver extracts have been used with success to counteract the severe anemias of worm infections. The proper functioning of the glands of internal secretion also has been found to play an important part.

With parasitology on the increase due to more and quicker travel between infected areas, there is also the need for immunity against, and prevention of, parasitic infections. The barrier that once confined certain diseases to the tropics no longer exists, therefore parasitology is developing.

DISCUSSION

DR. R. W. MENDELSON, Albuquerque, N. M.: I wish to thank Dr. Allen for his paper and think that we should pay more attention to stool examinations, as they are just as important, if not more so, than a blood examination. Many more accurate diagnoses would be made if more attention was given to the stool examination.

DR. FRANK RIDGE, Kansas City, Mo.: This subject interests me very much. I have a patient on my hands now who came in complaining of hunger pains, with history of considerable gastric colic. Stomach seems to be perfectly normal, but on duodenal drainage bile appeared, which was normal except for some mucus flukes. These were alive and I have not been able to get rid of them. Following the administration of gall-bladder extract, they disappeared for a few days and later returned. We have practically no parasitic infections in Missouri, at least they are very rare.

DR. S. L. BURTON, Albuquerque, N. M.: This seems to me a very important subject. I think we should use more caution in stool examinations, as this would result in much better and more accurate diagnoses and a number of lives might be saved thereby.

DR. L. S. PETERS, Albuquerque, N. M.: I am looking for some information. The Professor spoke about how little we know about the mechanism of the duodenum, and I agree with him. I just happened to hear Dr. Rich of Johns Hopkins talk on allergy, in which he claims to have separated allergy from immunity. He claims allergy is not necessary to immunity but the two dovetail into each other, as it were. I should like to hear Professor Allen's opinion on this.

DR. ALLEN (closing): In regard to stool examinations, I do not believe we can overemphasize the importance of these examinations and the finding of eggs and larvae, which may help a great deal in the diagnosis of the condition, which is frequently overlooked in the greater medical practices. As to the scarcity of parasites in Missouri, Dr. Ridge is partially right, I think. Probably they are scarce, but one reason they are scarce is because we have not recognized them. The whole subject of parasitology has not been worked to its fullest extent like some of the other phases of medicine. Regarding immunity and allergy, I still regard them as the same thing and will at least until more work has been done on them. Whether one is necessary to the other or not, I do not know. The medical profession is much too busy with clinical material and clinical work to experiment upon a maximum of immunity. Immunity seems to me to be the widest field along bacterial lines, if you can call immunity bacteriology, and what we are going to learn regarding immunity in the future is going to exceed by far anything we have known in the past.

THE TREATMENT OF DELIRIUM TREMENS

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(Read before the New Mexico Medical Society, at its Forty-Ninth Annual Meeting, at Albuquerque, N. M., May 20-22, 1931.)

Notwithstanding legal prohibition of the manufacture and distribution of alcohol in the United States, physicians of today may often be concerned particularly with two types of alcoholism: the acute alcoholic and the patient with delirium tremens.

The care and management of the acute alcoholic may offer more complexities than it did ten or twelve years ago, the complexities having arisen from some of the peculiar, unusual, and dangerous substitutes for alcohol which may find their way into the human body. It is unnecessary to enumerate these various concoctions, which include such things as cologne, bay rum, various hair tonics, and even shellac, "canned heat," and so forth. Confronted with the ever-present dangers inherent in the imbibing of these dangerous beverages, it is wise for physicians to continue to be familiar with the emergency treatment of methyl alcohol poisoning, or at least see to it that such patients are given the benefit of immediate hospital care where such treatment can be obtained. The handling of the acute alcorolic should not present very much difficulty, provided he has not partaken of some unusual form of stimulant, or has not been poisoned by methyl alcohol.

Some years ago, the usual treatment of the commonly called "Saturday night drunk," consisted in allowing the victim to "sleep it

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off" in the cold, draughty, and often damp cell of the local police station. Here the acute alcoholic often slept off his toxication, only to die a few days later of pneumonia. In some cities, particularly those having a rigorous winter climate, the death rate from pneumonia, directly traceable to poor care and attention, or rather, the lack of attention given acute alcoholics in police stations, rose to such a high mark that intervention by the local health authorities was required.

As a rule, about all the acute alcoholic requires will be a comfortable place in which to sleep. and protection from cold and exposure. But if the degree of alcoholic stupor is very great, if the heart action is weak, and there are other signs of collapse, a gastric lavage, preferably with some alkaline solution, is indicated, and also symptomatic cardiac stimulation. Again let me caution regarding the danger of overlooking a possible methyl alcohol poisoning in such instances, and the necessity of instituting prompt treatment.

Perhaps one of the most serious and alarming of the conditions due to alcohol which the physician may be called upon to treat, is the condition known as delirium tremens, an acute psychosis of alcoholic origin. For the most part, delirium tremens occurs after many years of over-indulgence in alcohol, but it is not infrequently met with in persons who have started their drinking within a comparatively short time, when it is usually the termination of a prolonged alcoholic debauch. In the chronic alcholic, the attack is often initiated by some special episode: the onset of some acute febrile disease (pneumonia, influenza, and so forth,) or by some severe trauma—a fractured leg, head injury, and so forth.

One factor in the production of delirium tremens, as borne out by the history of several patients, seems to be alcoholic over- indulgence in the absence of proper food intake. Thus, one patient consumed at least one quart of rye whiskey a day for nine days, and during that time his food intake amounted to one dill pickle. Another patient drank a large amount of gin during a period of five days, and in that time his food consisted of three scrambled eggs and one banana.

This abstinence from food seems to be one of the important links in the vicious circle which obtains in delirium tremens. The prolonged alcoholic indulgence produces an alcoholic gastritis. The patient then, perhaps, increases his drinking in the hope that the flagging appetite may be restored by the stimulation of the alcohol. But, instead of bringing back the appetite, the increased amount of drinking only serves to cause an exacerbation of the gastritis and an actual repugnance towards food. Thus the ideal conditions for the production of delirium tremens are set up.

Some writers state that occasionally the attack of delirium tremens is preceded by various prodromata stretching back over varying periods of time, from a few days to several weeks, and even longer. Poor sleep, interrupted by night-mares, increasing irritability, uneasiness and vague feelings of anxiety, occur. In addition to these manifestations, there may occur transient sensory falsifications and delusional misinterpretations applied to the simplest and most commonplace things in the patient's daily life and enviroment.

The sensory and tactile hallucinations, while not always constant, are, when they occur, quite a typical part of the picture. Imaginary spiders, worms, and so forth, are picked off the backs of the hands, parts of the clothing, the walls, and bedding. One very interesting feature of these hallucinations is their frequent tendency to appear as diminutions or lilliputian in size: elephants are seen the size of mice; cats, dogs, and rabbits appear the size of the common house fly. The explanation of these peculiar sensations lies in the fact that the finer nerve endings in the skin have acquired a certain degree of alcoholic neuritis, the patient's clouding of consciousness preventing him from recognizing or evaluating such sensory stimuli in their true light, and thus they become falsified and misinterrepted. The well-known fact that the hallucinations and illusions present in delirium tremens are often of such a ghastly and horrifying nature, has given to the lay mind the term "the horrors" to be applied to this disease.

In the main, the treatment of delirium tremens should consist of (1) sedative, (2) elimination, (3) support, (4) nursing.

(1) Sedative: A patient with full-fledged delirium tremens may be wildly and furiously delirious, and the intensity of the tremor may be such as to render it physically impossible for him to remain quiet. In such instances and under such conditions, sedative measures are required to prevent or to ward off complete exhaustion or dangerous collapse.

With a patient on the verge of collapse, one must remember that we are dealing with a heart whose myocardium has been weakened from several sources, such as the poison-

ing from the alcohol, the lack of proper or adequate nourishment, and the added strain of the delirious excitement. Under such circumstances, the use of sedatives such as morphia, chloral, or hyoscine, is absolutely contraindicated.

By far the best means to be used in quieting the patient is hydrotherapy. Such procedures may be difficult to carry out in the home, and therefore the patient should be in a hospital. I do not believe that we possess any more efficient methods of quieting the patient than by the use of the continuous tub bath, given at a temperature of ninety-eight to one hnudred degrees. If a tub, equipped with apparatus to insure a constantly regulated inflow and outflow of water, is lacking, use may be made of an ordinary bath tub, regulating the temperature by means of a bath thermometer. Failing in this, recourse may be had to the warm, wet pack. Hydrotherapy, properly applied, often works with an almost magical effect.

A question may be raised regarding the possible difficulty of keeping an excited patient in the tub. In such instances, it is true, a struggle may take place. If it does, and the patient is not in a too precarious or weakened condition, mild restraining measures may be employed. The patient will soon feel the quieting effects of the warm water and will submit to the tub or wet pack.

The tub or pack should be kept up for a period of two to four hours, provided the physical condition remains satisfactory. Frequently it will be found that, at the end of a two or three hour tub or pack, the patient will be sufficiently quieted to be removed and put to bed.

Even while in the tub or pack, attention should be directed towards insuring for the patient a proper amount of sleep, a matter of the utmost importance. To this end, there are several sedatives to be recommended.

With the introduction of sodium amytal (sodium iso-amyl-ethyl barbiturate) into our pharmacopeia, and its growing usage as a surgical anesthetic, a new sedative has been added to the list of those indicated in the therapy of delirium tremens. The great advantage which sodium amytal offers is that sterile solutions of the drug can be given intravenously. It is quite possible that the patient's mental condition may be such as to render oral medication difficult, if not impossible. The dosage of sodium amytal to be given intravenously is from 20 to 25 milligrams per kilogram of body weight. However, tihs form of medication is not without attendant dangers, and should be employed only in extreme cases, and then in the hands of some one experienced in its use and administration. Personally, I have never used sodium amytal in this manner. Sodium amytal by mouth or by rectum, in doses of six to nine grains, and repeated if necessary in three to four hours, has given very satisfactory results in cases of delirium tremens, and has also been employed in instances of predelirium tremens and mild alcoholic hallucinosis.

If sodium amytal is not available, one can always rely on veronal, given in ten grain doses every four hours up to thirty grains. The object of this medication with veronal or sodium amytal is to obtain what has been called "the critical sleep." This "critical sleep" is akin to the well-know crisis in pneumonia. If it can be obtained, this sleep is, perhaps, the most important step in the whole treatment of delirium. After such a sleep, lasting often for twelve or more hours, the patient will awaken in a much clearer mental condition and greatly benefitted physically.

(2) Eliminative treatment: It is very likely that the amount of alcohol the patient has consumed has caused a dehydration of the body tissues, and also set up an acidosis. To overcomme these conditions, fluids should be forced, not only to aid elimination through the kidneys and intestines, but also to combat the acidosis. The water which the patient rdinks should contain some mild saline cathartic, such as sodium phosphate, fifteen to twenty grains to the pint of water.

If there is evidence of much acidosis, glucose, intravenously, is a safe and rapid method of rendering the body alkaline. Fruit juices, fruit punches, and other alkaline drinks, can also be employed. Generally it will not be difficult to persuade the patient to drink copious amounts of fluids, but it is best to give them in small amounts, and frequently, rather than in large gulps.

On the theory that the profound degree of mental distrubance seen in delirium tremens is possibly due to a toxxic factor produced by the action of the alcohol, or is the result of cerebral edema, lumbar puncture and the withdrawal of large amounts of spinal fluid has been recommended. Acting in the same manner as venesection in eclampsia, acute uremic states, and so forth, the withdrawal of spinal fluid from the subarachnoid space removes such toxic substances as may be present, and also, if there is cerebral edema, relieves pressure.

In the hands of several workers, extremely satisfactory results have been obtained, especially by Goldsmith, working in the Psychopathic Division of the Baltimore City Hospitals. Dr. Goldsmith's excellent paper on the subject of spinal drainage in alcoholic deliria and allied conditions, appeared in the American Journal of Psychiatry for September, 1930. Dr. Goldsmith stresses the points that the duration of the delirium has been lessened, the patient's stay in the hospital has been shortened, and a general improvement noted in large majority of cases. That this procedure may not be as easy to carry out as it sounds, must be evident to any one who has had contact with this type of patient. The possibility of difficulty in keeping a patient quiet enough to permit the puncture to be done, may furnish some objections to this type of therapy. But, after a preliminary quieting has been accomplished by the methods described above, there is no doubt but that spinal drainage produces very favorable results in instances where the delirium tends to be long drawn out.

(3) Supportive treatment: While the various measures, outlined above, are being put into effect, we must not lose sight of the fact that, in many instances, we have on our hands a patient in extreme exhaustion, even bordering on collapse. The preservation of the body heat, particularly after removal from the the continuous tub or wet pack, is very essential. When necessary, the heart should be supported by means of digitalin, strychnine, and so forth. As soon as it is feasible,—and the condition of the patient must govern this—attempts should be made to get him to take food. Remembering the irritated state of the patient's gastric mucosa, the food provided should be bland, but at the same time nourishing and suppoortive. Milk, malted milk, milk containing beaten-up eggs, orange juice, soups, and so forth, comprise a type of nourishment best suited.

(4) Nursing: Although put last, the question of the proper amount and kind of nursing is of much importance. Attempting to handle a case of delirium tremens with rough, clumsy, tactless, and ill-trained or untrained nurses or orderlies, is liable, in the end, to do much harm. The very nature of the disease implies that the patient may be difficult to handle. One must naturally expect resistance, but in many instances, when a struggle does occur, it may frequently be traced to clumsiness, lack of tact, or loss of temper, on the part of orderlies or nurses. The monotonous, unruffled repetition of some simple request, such as, "please get back into bed," seems, in time, to break through the clouded consciousness and to have a soothing effect upon the patient. The mere fact that in the same room there is some one who does not appear hurried, flustered or at all alarmed by the horrible sights seen by the patient, often results in an easing up of the fear effect. Thus one patient, who had made a very satisfactory recovery from a rather acute attack, told me afterwards that he felt it was the presence of a nurse in his room during his worst time, which helped him to a recovery.

I do not wish my hearers to form the opinion that the treatment of delirium tremens consists only of hydrotherapy, the administration of sedatives, the symptomatic supporting and nursing measures. Delirium tremens can be, and often is, a desperate illness which will tax to the utmost the ingenuity and skill of the attending physician. It is necessary to remember that, superimposed upon an attack of delirium tremens, there may be such complications as an acute nephritis, lobar pneumonia, other acute infections, myocardial insufficiency, extreme collapse, not to mention such conditions as a fractured limb, skull, or other bodily injuries which may have played a role in initiating the attack.

But, in spite of all efforts, the attack may have a fatal ending. Statistics gathered both in this country and abroad show a fatal termination in 10 to 15 per cent of the cases.

In conclusion, there are certain points which I desire to re-emphasize.

1. Delirium tremens is an acute psychosis occurring on a basis of chronic alcholism, but it may also result from a prolonged spree. As this condition is a psychosis, treatment in a psychopathic hospital is indicated.
2. The attack may be fulminating and the result of some severe injury or acute infection occurring in a chronic alcoholic.
3. Hydrotherapy, properly utilized, probably offers us the safest and most efficient means of quieting the patient.
4. The use of such drugs as morphia, chloral, and hyoscine, is contraindicated in delirium tremens.
5. Even during the acute stages of the disease, eliminative, supportive, and nursing, treatment must not be neglected.

DISCUSSION

DR. M. K. WYLDER, Albuquerque, N. M.: Dr. Brush's paper has been very enjoyable to me and recalls an incident which occurred many years ago when I was a patient in the hospital. Nearby was a fellow suffering from delirium tremens and his condition was such that he could not stand the slightest noise. I remember one night in particular, a cat was sneaking across the floor, when we were all awakened by the patient screaming out,

"What do you mean walking around here stamping your feet like a horse?" The abnormal sensibilities of this type of patient are difficult to realize.

DR. R. O. BROWN, Santa Fe, N. M.: I should like to ask Dr. Brush if paraldehyde has proven of any benefit in cases of delirium tremens.

DR. O. I. NESBIT, Espanola, N. M.: When I was an intern in the hospital, whenever a case of this type was brought in, we did a spinal puncture and those upon whom it was done seemed to improve much faster than others who were not so treated.

DR. BRUSH (closing): In regard to Dr. Wylder's story about the cat, I should like to ask him if it was really a cat. The patient might have misinterpreted the cat as being something else than a cat. I have used paraldehyde a great deal and consider it a very safe and very efficient sedative. I have never made spinal puncture in these cases.

ELECTROCAUTERY IN TUBERCULOSIS OF THE LARYNX

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(Read before the Seventeenth Annual Meeting of The Medical and Surgical Association of the Southwest, held at Phoenix, Ariz., Dec. 3-5, 1931.)

Tuberculosis in any form is of vital importance to all of us who practise medicine in the Southwest. The climatic advantages of this section can never be ignored, and the example has been set by many physicians, who nave come here because of their own health or that of some member of their families.

ETIOLOGY

Laryngeal tuberculosis is to be found in a rather large percentage of cases of pulmonary tuberculosis and in most cases is secondary to that condition. Statistics show that laryngeal involvement varies from 12 to 45 per cent, depending on whether the pulmonary condition is an early or advanced one. The infection is thought to take place most often through the lymphatics, or from infected sputum passing over an abraded surface of the mucous membrane.

SYMPTOMS

A patient with pulmonary tuberculosis who experiences change in the quality of the voice coming on gradually after cough or excessive use, or whose voice tends to tire easily, often exhibits early symptoms of laryngeal involvement. Pain depends much on the location of the lesion. The vocal cords and other structures within the larynx may be seriously involved, with little pain; while a slight lesion of the epiglottis or aryepiglottic folds might produce much discomfort. Acid foods and liquids cause the pain.

PATHOLOGY

The earliest lesion to be seen is a slight thickening of the mucous membrane, which becomes more prominent on phonation. The early lesion is more often seen in the posterior commissure or interarytenoid space, and next most often on the vocal cords. Regardless of location, the first evidence noted is an infiltration, then an edematous swelling in loose tissue, and later an ulceration. Stephens[1] defines tuberculosis lesions in the larynx as consisting of infiltrations, ulcerations, perichondritis and tuberculomas. Tuberculosis in the larynx, as elsewhere, begins in the formation of a tubercle. The mucous membrane over the tubercle becomes destroyed and an ulcer results.

According to most authorities, when the tubercle bacillus comes to rest in a tissue, the fixed connective tissue elements are stimulated, causing a production of epithelioid cells. These cells clustered around a central area are elongated in shape and form the most constant feature of a tubercle. This cluster of cells is surrounded by an inflammatory zone of mononuclear cells, lymphoid in type. In the center of this mass is often found a giant cell, consisting of a large mass of protoplasm containing many nuclei. Such a tubercle is without blood supply and the center undergoes necrosis, due as much to the lack of blood supply as to the toxins of the tubercle bacilli. Healing of such an area may take place by the deposit of calcium salts in the necrotic area and the formation of a dense surrounding capsule, or by a stimulation of the fixed connective tissue cells and a changing of the epithelioid cells into fibroblasts, whereby fibrous tissue is formed in sufficient amounts to encapsulate the lesion. Ulceration and infiltration are superficial until secondary infection takes place.

DIAGNOSIS

In a lesion of the larynx, the three conditions most often confused are tuberculosis, syphilis, and cancer. It is possible for any two or all three conditions to be present at the same time. However, in the great majority of cases, a laryngeal lesion is tuberculous if there is tuberculosis in the lungs. A syphilitic ulcer is sharply defined with clean-cut edges, and the Wassermann and therapeutic tests are of decided value. It is not always easy to distinguish a malignancy from a tuberculous lesion, because it is not uncommon to have a cancer in a patient suffering from tuberculosis. A cancer is more prone to attack the middle or anterior third of the vocal cords, while tuberculosis primarily attacks the posterior commissure and adjacent parts. Biopsy would be positive but is dangerous in tuberculosis and also in cancer, unless one is prepared to do the necessary surgery at once.

PROGNOSIS

It has been stated that tuberculosis of the throat diminishes a patient's chances of recovery by nearly 50 per cent. Forty years ago, Morrell McKenzie stated: "It is not cer-

tain that any case of tuberculosis of the larynx has ever recovered."

Tuberculosis of the larynx, as a rule, progresses much in keeping with the condition of the lungs, although there is many a patient whose larynx has steadily improved while his lungs were growing worse. This is frequently true under present-day treatment. However, a laryngeal involvement is always serious and especially if extrinsic and involving the epiglottis and aryepiglottic folds.

Modern treatment has greatly improved the outlook in laryngeal tuberculosis.

TREATMENT

An early diagnosis goes far in the successful treatment of laryngeal tuberculosis. The laryngeal mirror should be used whenever an examination of the chest is suspicious or positive for pulmonary tuberculosis, and the throat should be examined once each month thereafter as long as the pulmonary lesion is active and advancing.

A large percentage of very early cases will clear up merely by rest of voice together with proper general care. In these early cases the patient should be put on whisper, and if definite improvement does not follow in two or three weeks, then the doctor should insist upon silence and the use of pencil and pad. These cases many times are greatly benefited by exposure of the larynx to sunlight by means of the metal Verba mirrors. If, in spite of these methods of treatment, the infiltration increases or an ulcer develops, or if an ulcer is present at the first examination, there is no therapeutic agent known to science at this time which approaches in effectiveness the electric cautery. Most of the country's leading laryngologists highly favor this method of treatment. All value rest of the larynx above everything else, but, when this is not effective, we have a remarkable agent in the electrict cautery.

Fetteroff[1] mentions the experimental work done by himself and George B. Wood in 1910 and 1911. Guinea pigs were inoculated with the tubercle bacilli and the resultant lesions cauterized with the electric cautery. It was found that an inflammatory zone developed around the area destroyed—newly formed blood vessels and fibroblasts. In six days the reaction was more marked, blood vessels were more numerous and there were larger deposits of fibrous tissue between the epithelioid cells and the tuberculous mass. In twenty days the lesions were almost healed. They concluded that any thing which aids the cicatrization of a tuberculous nodule by the formation of fibrous tissue is of definite value in the cure of the disease.

Pryor[2] regards rest of the voice as the most valuable procedure in the treatment of laryngeal tuberculosis, regardless of what other type of treatment is used. He also mentions the sunlight treatment by use of the Verba mirrors manufactured in Colorado Springs. There are some cases which this type of treatment does not help, and it is in such cases he relies on the electric cautery. He states that with this agent most spectacular results are noted in the relief of pain.

Kellam[3] states that the specific results following the skillful and judicious use of the electric cautery in the treatment of laryngeal tuberculosis, bear a similar relation to this complication as insulin to diabetes and arsphenamine to syphilis. He concludes that the electric cautery has largely superseded curets, heliotherapy, and acid applications, in the treatment of tuberculous ulcers, infiltrations and granulations, and that the pessimism which heretofore has doomed every case of ulcerative laryngeal tuberculosis to death is not justified.

Terry[4] follows one of two lines of treatment when a diagnosis of laryngeal tuberculosis is made—rest of voice, or electric cauterization. Disturbing the patient for frequent examinations or various local applications is as much contra-indicated as the too frequent removal of surgical dressings from a healing wound. The electric cautery is the best method of treating the tuberculous lesion which fails to yield to voice rest. With early lesions, complete healing is the rule after a few cauterizations. With most of the advanced cases it is the most efficient method for the relief of the excruciating pain and enables the patient to take much needed food. Many times healing will take place following cauterization of extensive lesions.

William C. Warren, Jr.,[5] thinks all laryngeal tuberculars should be in a sanatorium so as to carry out properly silence treatment, and if this does not cause improvement then the electric cautery should be used.

Looper and Schneider[6] state that, for the active treatment of the tuberculous larynx, they have found the use of the electric cautery most beneficial and employ it in preference to all other methods. Early cases clear up after two or three treatments and advanced cases show marked improvement after a few cauterizations. In severe and hopeless cases, the cautery is of great value for relief of pain and coughing. Many local applications have been tried and abandoned. In the treatment of 500 cases of laryngeal tuberculosis, the electric cautery was found to be the best treatment and, of all cases, 65.5 per cent were improved and healed, and 26 per cent were improved and healed in far advanced cases.

Stephens[7] states: "Of all methods of local treatment none is so productive of benefit as the electric cautery.

Glenn and McGinnis[8] speak of the good results obtained by many men in treating tuberculosis of the larynx with electric cautery, but prefer the use of the water-cooled mercury quartz light by means of specially made laryngeal mirrors, because this method requires less expert manipulation of instruments.

Spencer[9] states that electric cauterization offers a valuable means of destroying both ulcers and tubercles and it is doubtful if any method of treatment has yielded better results than the cautery.

Sharp[10] recommends vocal rest for all patients who have definite signs of tuberculosis in the larynx, and the electric cautery where there is a tuberculoma, infiltration, ulceration or edema. The quartz light has not been of value to him.

Muskat[11] considers, in the combat of laryngeal tuberculosis, rest of the voice most important, and the electric cautery when this has failed.

Briggs[12] says that the electric cautery is proving by far the greatest means of combating the lesions of laryngeal tuberculosis and especially when other treatments are not promising.

Green[13] has done much work in treating laryngeal tuberculosis with the electric cautery and is getting excellent results.

Looper[14] states that with the electric cautery we can accomplish in one application what could be gained by weeks of silence, and, as soon as a tuberculous lesion of the larynx is recognized, cauterization should be applied if the patient's general condition will permit it.

Brown[15] considers the electric cautery the best therapeutic agent we possess in tuberculous ulceration of the larynx.

Sir St. Clair Thompson[16] speaks of the older writers' considering the recovery from laryngeal tuberculosis as improbable as we now consider recovery from tuberculosis of the meninges. Early cases are given two or three months of silence before resorting to the cautery. When healing is stationary or slow, or where the patient is not able to wait the necessary time, the cautery is used. Of 477 cases of laryngeal tuberculosis, twenty-three recovered with silence, fifty on whisper and forty-six with the use of the electric cautery.

Wood[17] states that the electric cautery is undoubtedly the best surgical method of treating laryngeal tuberculosis, and the results attending its proper use have taken this disease out of the list of laryngological nightmares. The object of cauterization is the production of a scar rather than the destruction of all tuberculous tissue, and this fact makes the procedure a comparatively minor affair. With the possible exception of very large tuberculomata and completely diseased epiglottis, all the clinical types of localized tuberculous lesions are more successfully combated by the cautery than by any other form of treatment.

In my personal experience during the past three years, I have seen close to a hundred cases of laryngeal tuberculosis, and of this number have used the cautery in about 50 per cent of the cases. In the early cases, rest of the voice will often effect a cure where there is a tendency for improvement of the pulmonary lesion. Many of these cases have received definite benefit by use of the Verba laryngeal mirror, which enables the patient to reflect the sun's rays into his larynx. Often very painful throats experience a sensation of warmth and comfort after the use of heliotherapy. It has been my practice to subject patients to rest and heliotherapy unless there is ulceration present on first examinatoin or one develpos in the course of more conservative treatment. I then use the electric cautery. However, I am coming to believe that many cases of infiltration would more quickly heal if the sharp-pointed cautery were used early and plunged into the more prominent areas of infiltration. In ulcerations I have little faith in applications, rest of voice, or any other treatment except the electric cautery. I grant that a few such cases get well by the treatment of "watchful waiting" but the healing process is greatly hastened by use of the cautery in the early and moderately advanced cases, and the relief from pain in the far-advanced cases is more pronounced than by any other method at our disposal. All of us see cases who seem doomed from the start—patients who have little resistance and whose pulmonary and laryngeal lesions advance in spite of all that can be done. These are the cases we can often give the most wonderful relief by use of the cautery. However, in the very sick patients, we must be careful not to overtax them with too many applications. These patients are often given great relief by the application of the cautery to one or two painful areas.

TECHNIC

Except in the very nervous and apprehensive patient, no preliminary medication is used. At times we have given 1/8 or 1/6 gr. morphine by hypo, three quarters of an hour before using the cautery.

The very sick patients are allowed to remain in bed, as the illumination and necessary instruments are easily arranged by the bedside. The indirect method is far preferable to the direct and just as easy after a little practice. A 10 per cent solution of cocaine is applied lightly to the pharynx and soft palate, and with a curved applicator 10 per cent cocaine is then applied to the epiglottis. In a few minutes the arytenoid and posterior commissure are touched and, if the vocal cords are involved, they are also cocainized. As a rule, anesthesia is sufficient after 10 minutes; if not, more cocaine is applied. For the deeper ulcers and infiltrations, a sharp-pointed cautery tip is used, and for the broad ulcers, a rather flat cautery. In this first case the cautery is plunged rather deep into the infected tissue; while in the second, the ulcer is seared rather superficially. The point should be heated almost white hot so the tissues do not stick to it. It is the reaction to the burn, and not the destruction of all the tuberculous tissue, we seek, and for that reason we should be gentle in our manipulations, and make it a point to do too little rather than too much. From one to five cautery applications are, as a rule, all the cauterization we should do at one sitting. The procedure may be repeated in two to four weeks. One should avoid cauterizing deeply in the region of the cartilagenous joints, especially the crico-arytenoid, for fear of producing an ankylosis.

As a rule, pain and discomfort are markedly relieved after use of the cautery. At times, there is some pain for a day or two, requiring sedatives, but this is seldom the case if we do not attempt to do too much at one sitting.

Since using the cautery, there are few cases I feel are hopeless until I have tried this method, and these hopeless cases are generally much relieved, both physically and mentally, by its use. I have seen a few far-advanced cases get entirely well by use of the cautery. I have in mind three cases who had ulcerations over practically all parts of the larynx, each of whom lost most of the epiglottis and parts of the vocal cords. These cases finally made complete clinical recoveries by repeated electric cauterizations.

I feel that the electric cautery is far superior to any other method of active treatment we now possess for laryngeal tuberculosis, and the more its good effects are known, the more this valuable therapeutic agent will be used.

SUMMARY

1. Laryngeal tuberculosis is a complication of pulmonary tuberculosis in from 12 to 45 per cent of cases, depending on the severity of the pulmonary lesion.

2. The tuberculous lesion is healed by the deposit of calcium salts in the necrotic areas and by an increase of fibrous tissue which develops from the fixed connective tissue cells, and probably by a changing of the epithelioid cells into fibroblasts. Such healing processes are encouraged by an increased blood supply.

3. Rest is important in all cases of laryngeal tuberculosis. The electric cautery is used in all tuberculous ulcers, and infiltrations which do not respond to rest of the larynx. Heliotherapy is used in many cases.

4. The electric cautery heals, not by the destruction of all tuberculous tissue, but by the development of an inflammatory zone in which newly formed blood vessels and fibroblasts are produced, which hastens healing by cicatrization.

5. Most early cases heal with the cautery, while the advanced cases are relieved of pain.

6. Electric cauterization is a minor procedure, done best under cocaine anesthesia and by the indirect method.

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THE USE OF INSULIN IN THE TREATMENT OF ANOREXIA AND MALNUTRITION

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(Read before the Seventeenth Annual Meeting of the Medical and Surgical Association of the Southwest, held at Phoenix, Ariz., Dec. 3-5, 1931.)

To quote Bodma: "Falta and Voigt, before the discovery of insulin, enunciated the hypothesis of a pancreatogenic obesity dut to the hyperfunction of the islands of Langerhaus." Since that time, enough work has been done with insulin in alimentary dysfunction to teach us that we are yet only pioneering, and that this agent that assists carbohydrate metabolism is worthy of much more study than we have given it to date.

It is true, we may have malnutrition without anorexia, but usually this is not the case. The person that has the appetite to eat, in most cases will have a well-nourished body. There may be some glandular condition existing, such as hyperthyroidism or hyperactive suprarenals which might produce loss of weight. Other causes of loss of weight are insufficient food, poor assimilation, increase in organic metabolism.

Mezthalen and Cario conclude that insulin and epinephrine are antagonistic in their action. It is known that an injection of the marrow of the suprarenal is followed by hyperglycemia, glucosuria and a diminution in the amount of glycogen. Metz also points out this antagonism; stating that insulin and epinephrine maintain a balance in the carbohydrate metabolism, in that the insulin aids the entrance of sugar with the cells and epinephrine retards it. Cori feels that epinephrine promotes the decomposition of body glycogen, insulin increases liver glycogen, which makes it necessary for storage. Cannon calls epinephrine glycogenolytic and insulin glycogenetic, thus affording a natural corrective response when there is an abnormality existing. It is almost impossible to carry an individual beyond the normal weight with insulin. Insulin increases the permeability of cells for sugar. It is thought that insulin causes water retention in the cells. It changes carbohydrates into fats, and tends to increase the glycogen content of the musculature.

It comes, then, to a question of producing the appetite that is necessary for the particular individual's needs. Insulin is the best agent that we have found to produce that desire for food. There is a variance of opinion as to what causes this increase of appetite with insulin in cases where exhaustive use of other inducements have failed. It is a well-known fact that it does occur, but many men do not attempt to explain it, and others only theorize.

Quigley and Johnson, in a more detailed study on humans after various fasting times and with rubber balloons placed in the stomach—along with the council of Carlson and Templeton, arrive at something more definite. With these balloons the gastric motility was recorded, after insulin injection to fasting men, by a water manometer and fluoroscope. Briefly I may, to advantage, state their findings and conclusions. The sensation of hungar pangs was related chiefly to activity in the fundic portion of the stomach. Also, the activity of the stomach was as great during digestion and vomiting as that occurring in empty stomachs, but there was no hunger pang, though the activity of the fundic region is much greater during hunger pang than during digestion. The hunger pangs might be associated with activity in any part of the stomach, though, if the sensation originates in the cardiac end, there is none in the fundic. When sensation is related to pyloric activity, conscious sensation may be the result of summation of stimuli.

The subcutaneous injection of 12 to 20 units of insulin increases gastric motility in an empty stomach. Smaller doses than this do not. The first activity appears in the pyloric portion, such activity continuing from three to five hours, with marked hunger pains. This motility is not altered by extraneous stimuli such as nausea, unpleasant emotions, smoking, sight of food, nor by the introduction of glucose into the stomach, but is inhibited by its introduction into the duodenum. Adrenalin subcutaneously will cause a partial inhibition by its action on the gastric splanchnic nerves and by increased blood sugar. Atropine in rather large doses will also inhibit gastric motility, probably by paralysis of vagus nerve endings. Gastric motility induced by insulin is augmented by sleep. As the muscular tone is gradually increased, the sensation of hunger appears, along with other symptoms of hypoglycemia, such as weakness, restlessness, sweating, dyspnea, and so forth. In fact, these indications of prostration and hyperexcitability may be so marked as to crowd out the sensation of hunger. The administration of atropine will likewise do away with the sensation of hunger, and so, to a lesser degree, will adrenalin. The patient then feels much better until the drug effect is gone, which is about twenty minutes, only to have such symptoms rapidly grow worse, and the patient is in a dangerous condition unless glucose is given immediately.

We have, then, the hunger sensation following injections of insulin, directly proportional to the degree of gastric motility. It rests to decide whether this increased motility is produced by direct action on the gastric mechanism, or indirectly by producing a hypoglycemia, which then stimulates this mechanism by reducing the metabolism of carbohydrates.

In this connection, we have run two series of cases on patients with tuberculosis, one of twenty cases during May and June, another of fifteen during September and October, each of six weeks' duration. They were all institution cases on bed rest, and include incipient, moderately advanced, and far advanced cases. Also six cases non-tuberculous, in which little or no pathology could be found, except loss of appetite and malnutrition. These non-tuberculous cases were all ambulatory, two were working. Time and space will not allow a detailed case report in each case. However it will be interesting to note that all of the non-tuberculous cases had tried various methods in an effort to gain weight—bed rest, forced feeding, milk diets, and so forth—but with failure. Not one of these cases failed to gain from the lowest of four pounds to the highest of sixteen pounds in six weeks, with an average of eight pounds, in five cases. One case stopped after a gain of four pounds in one week, another had an intermission of three weeks, but continued to gain after the second three weeks until sixteen pounds were gained. There were no untoward developments in any case. Their reports were very similar, that is, they developed appetite and enjoyed food. They invariably felt much better, with more energy; they felt like doing their work, could sleep better. The skin took on a more moist and healthy appearance, with some color in cheeks. Indeed, they are happy over the results until the subject of administration is brought up. Here it is not all happiness. To call at a doctor's office three times a day or to have the doctor call, the expense is prohibitive. It is necessary, then, to teach the patients to make their own injections. For this reason we advised such cases to take it only twice daily, before their best two meals. In fact, the results obtained with two injections were about as good as with three. This can be explained by the fact that the effects of a dose of, say, 20 units will last about six hours; therefore, it will overlap the following meal. There was no evidence of water retention to the point of edema. Though I dare say the fast rate of gain during the first week is probably due to reestablishment of a normal water retention and not altogether to storage of fat. There was better bowel elimination and normal urine output. In only two cases can we report as to how well this gain of weight is retained. The others are of too recent date. One has held sixteen pounds gained in nine weeks beginning about May first. Another, twelve pounds for two months.

In tuberculosis, we have an entirely different situation. There is a known, definite cause for the loss of appetite or undernutrition, which is frequently overwhelming. The patients are broken in health and in morale, as well as financially. And nothing seems to turn the tide so completely as to have a sudden return of the appetite. They regain their optimism, their hope is restored. They are ready to try again. Nor was this accomplished in all of our thirty-two cases. Neither was there a gain of weight in all cases where the appetite was improved. However, the most marked improvement in any case was in one who did not gain at all, though the appetite was some better. This was a case that had been practically moribund for over a year, with far-advanced tuberculosis in both lungs, running daily fever of 100° to 102°, with profuse cough and expectoration. She had gotten to the point where the starvation acidosis was producing vomiting, which was controlled by intravenous glucose. Now she is eating three fairly representative meals and able to be up and about the sanatorium, her fever ranging from 99° to 100°. Twenty-three of the thirty-two cases run, showed satisfactory gain in weight ranging from two to twelve pounds, with an average of six pounds. There was little to no change in ten cases, which can be explained in most cases by interrupting complications, and were all discontinued after a week to ten days. Of those that gained, they all stated that they felt better, had a good to ravenous appetite. In several, their constipation was relieved to a great extent. They slept better. There was a feeling of optimism. They were willing and faiting for their shots each time. We noted no excessive water retention, nor was there any focal infection set up. A diuresis was noted in five cases after the first week. Two cases were nauseated within twenty minutes and could not eat at all; so it was discontinued.

The technic of administration is simple for the individual case, but is complicated when running a large series, due to the fact that many cases differ in the amount they can take and also in the time best suited for the case. It should be given long enough before the meal so that hunger pains will begin to appear. This time will vary from

twenty minutes to one hour or more. Ordinarily a group of cases can be started with five units thirty minutes before one meal a day, increasing a meal a day for three, then increasing five units each day until fifteen to twenty-five units are given three times daily. That will vary according to the size of the individuals and the amount of food they are induced to take. One unit of insulin will take care of about 1¼ to 2 gm. of sugar.

There was no particular change made in the diet. It is a mistake to have an excess of either carbohydrates or fat, for it is not only a storing of fats that we want, but, rather, growth of the bones, muscles, glands, and everything else. Consequently, the protein and salt contents of the diet must be kept up to the normal proportions. It is true, the hypoglycemic reactions must be controlled. They will usually appear about three and a half to four hours after meals. This can be easily accomplished by giving a glass of orange or lemon juice sweetened with a tablespoonful of sugar or a couple of pieces of candy, and the patients soon learn this and are prepared. Fear of the reaction should never be a complication if a careful study is made of each case. Nothing should be given between meals that will not be out of the stomach by the time the next dose is due. Again, there is a great tendency in the beginning for the patients, in their zeal, to eat too much. Such injudicious eating may result in a severe attack of indigestion lasting for days, with loss of weight, your insulin getting credit for failure. No results will be obtained in asthmatics where adrenalin is given repeatedly.

In summarizing, let me state here that the value of our study at the St. Joseph's Sanatorium in El Paso, as revealed in this paper, only poorly represents what we hope to learn from a more detailed application of insulin in the apparently healthy undernourished individuals, as well as in the various diseases. Though our observations have been chiefly with tuberculosis, most of the literature deals with its use in other conditions. Insulin can be used in almost any condition of undernourishment. It is of particular advantage in cases that present no definite pathology, the constitutional asthenias, those with unstable nervous equilibrium, in visceroptosis. It is useful in any case needing forced alimentation. It is of advantage in tuberculosis, arteriosclerosis, senile emaciation, Basedow's disease, convalescence after many infectious fevers where the appetite is slow in returning. Lobbe states that it is the best method of treating nurslings who are underweight. Nobecourt and Levy found it gave relief in athreptic children suffering with digestive disorders which prevent assimilation. Moutier got good results in a series of cases of dyspeptic women following pregnancy. In fact, the list of conditions in which insulin may be used to advantage is almost endless. Indeed, it is our opinion that insulin given judiciously will prove to be an adjunct with startling results in any condition where there is faulty carbohydrate metabolism.

There are a few contra-indications mentioned by some authorities, though I question the validity of such reasoning. For instance, Haemmerli advises against it in myocardial conditions or in valvular lesions, fearing that it might cause the heart muscle to yield glycogen too rapidly. Some fear that insulin may set up focal infections in tuberculosis, due to the protein substance left in it. A letter from the Lilly Laboratories states: "There is nitrogenous substance associated with insulin which is of the protoese type, but the protein-like material in Iletin is exceedingly small compared with the content of protein substance in the ordinary stock vaccines."

Pulmonary hemorrhage may present a contra-indication. Where the gastric spasm is severe enough to cause nausea, it is hard to use, but may be used if given to an individual with a full stomach. We found a few cases who seemed to have a peculiar intolerance for insulin, though a little more careful study might have solved that problem.

We arrive, then, at a few conclusions:

1. Insulin is a valuable adjunct in the treatment of anorexia and malnutrition.
2. It is our opinion that it may be used in almost any condition of undernutrition.
3. Insulin should be given only under careful supervision of a physician.
4. It is valuable in the treatment of tuberculosis.
5. The appetite is proportional to the degree of gastric motility set up.
6. As yet, our knowledge of its advantages in the treatment of diseases is very meager in comparison with what we hope to learn.

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INDUSTRIAL HYGIENIC PROBLEMS OF THE COPPER MINING INDUSTRY

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INTRODUCTION

The industrial hygienic problems of the copper mines are similar to those found in other metal mines. The extensive use of machinery has introduced a number of problems that affect the workmen more or less seriously. Consideration of all of these problems even briefly, could not be limited to a short paper. Consequently, it was thought best to confine the paper to the effect of dust.

The study of dust is receiving more consideration at present by the medical profession than any other hygienic problem in mines. This subject was thought to be especially applicable to this section, as a review of some of the mining papers* shows that the chemical analysis of some of the ores of the Arizona copper mines shows 69 to 69 per cent of free silica. Dust with silica content as high as this is recognized by the medical profession as being extremely dangerous when breathed in sufficient quantities for a considerable time. This paper will therefore undertake to discuss silicosis and suggested methods for its control.

DEFINITION

Silicosis is a synonym for that form of pneumonoconiosis produced by silica dust. It is a chronic disease of the lungs, characterized anatomically by fibrotic changes in the lungs and clinically by a progressive dyspnea, decreased chest expansion, and decreased capacity for work out of proportion to physical evidence of disease.

HISTORY OF THE DISEASE

Probably the most complete history of the disease is given in the Milroy Lectures of Dr. Edgar L. Collis†. Dr. Collis quotes Herbert Spencer in his account of human

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(Presented at a meeting of the Arizona Public Health Association, Nogales, Ariz., May 6, 1931.)

progress as saying that the starting point was "localization of human industries." He also quotes Sir Charles Lyell[3] and Dr. Isaac Taylor[4] as having described such localization in prehistoric factories for the manufacture of flint implements. A number of early writers, including Hippocrates, George Bauer, Chateauneuf, and others of this early period, described the effects of dust upon the lungs of miners and displayed familiarity with the disease little short of our present knowledge. Following the discovery of micro-organisms as a cause of disease, little thought was given for many years to the subject of dust, but within the last few years the subject has been revived and serious study has been given to the disease in this country and abroad. It has been found to be prevalent in the mining districts of Austraila, New Zealand, Great Britain, South Africa, and America.

More work has probably been done on the study of silicosis in South Africa than in any other country. For the years 1908 and 1909, the Miners' Phthisis Committee of South Africa considers that, out of a population of 12,000, approximately 1,000 men in any one year would reach the stage of definite incapacitation[5]. In the United States, investigators have found that silicosis is prevalent in many of the mining districts in the States of Missouri, Montana, Nevada, Idaho, Arizona, California, Alabama and Vermont. It is stated by Dr. A. J. Lanza, Assistant Medical Director, Metropolitan Life Insurance Company, that there are probably as many silicotics in the State of New York as there are in any other state of the Union. The disease is often contracted by those engaged in tunnel work, in excavations for large buildings, and in various dusty industries. Silicosis is not a rare disease, found only in certain localities, but is a widely scattered one, affecting a large number of men in the United States.

ETIOLOGY

The etiology of silicosis can be divided into predisposing and exciting causes. Among the predisposing may be mentioned race, age, occupation, physical condition, and disease. Age is an important etiological factor, as the disease apparently affects those beginning work in a dusty occupation in late life much more frequently than it does young men. It is now well recognized that the physical condition of the men is an important predisposing factor. Nasal obstructions sufficient to cause mouth breathing increase the incidence of silicosis. The presence of respiratory diseases, such as tuberculosis and asthma, have a very important bearing upon the incidence of silicosis.

The most important single predisposing factor is occupation. Mining is recognized as a dusty occupation However, not all men engaged in mining are exposed to large amounts of dust. The exposure to dust is largely limited to face men, most of whom are drillers, shovelers and their helpers, roof trimmers, and those who work in and around the face of the stope. Many underground occupations expose the men to very little dust, in some instances to less than they encounter upon roads and highways.

The exciting cause of silicosis is inhalation of finely divided particles of silica (SiO^2) over a relatively long period. Several theories are advanced to account for the harmfulness of silica dust. The old theory, and the one accepted by many, is that the fibrosis is produced by action of sharp-cutting edges and needlelike points, together with the insolubility of the dust particles. Dr. Leroy U. Gardner[6] calls attention to the fact that not all dust particles with such physical characteristics, carborundum for example, would readily produce a fibrosis. Dr. R. R. Sayers[7] states that Dr. Haldane notes that silica dust without sharp-pointed particles, such as precipitate silica, when heated enough to dehydrate, if inhaled, will cause silicosis similar to that produced by quartz dust. These facts occasion many investigators to believe that the mechanical action of silica dust has very little importance. Many investigators think that the fibrosis is produced by the chemical action of silica. Dr. W. M. Myers[8] found that silica dust from the Picher, Oklahoma, field was soluble in water. Dr. A. Mavrogordato[9] reports that silica is soluble in weak alkaline solutions similar to body fluids. He concludes that solubility and chemical activity of silica have great importance and that hardness and sharpness have but little importance in causing silicosis.

Another physical characteristic of etiological importance is the size of the dust particles. It is generally accepted by most writers that only those particles less than 10 microns in diameter are retained in the lung tissue. The larger particles are caught and removed by the ciliated epithelium of the air passages. Dr. A. Watkins-Pitchford and Dr. Moir[10] write that the dust particles in the lungs of miners on the Rand were mostly less than 5 microns and that only one particle in 2000 was over 8 microns and only one in 1,000,000 as much as 14 microns long.

The quantity of dust breathed by the men

is one of the most important etiological factors. This is recognized by all investigators and an attempt has been made to set an arbitrary limit upon the amount of dust in the air that would offer a reasonably safe condition. D. Harrington[10] states that the South African standard is 5 mg. or 300,000,000 particles per cubic meter of air. Dr. W. T. Nelson of Australia[11] states: "The Inspector of Mines considers it inadvisable for men to work in air in which dust counts exceeding 300 particles per cubic centimeter have been obtained." Section 7 of the Metal Mining Code of Oklahoma sets the standard as 300 particles per cubic centimeter. This standard has been adopted by the Industrial Board of the State of Kansas in its rules and regulations on mines.

The figures indicate rather close agreement among investigators of the dust problem in different countries that around 300 particles per cubic centimeter of air can be regarded as reasonably safe from injurious effects. But to maintain this low dust count in many mines is very difficult, so much so that in many mines it is not undertaken. D. Harrington[10] states: "There is probably not one dry mine in the United States, coal or metal, where the average is as low as 5 mg. per cubic meter of air. In general, the average air dustiness of working places of our dry metal mines runs about 20 mg. per cubic meter of air and many run about 50." These figures indicate that the workmen in the dry metal mines of the United States are exposed to larger quantities of dust than are those in South Africa or Australia; that it would be logical to assume that the average American miner would contract silicosis in a shorter period of time than they do in these countries. Dr. Sayers[12] states: "In the gold mines of South Africa where conditions are good the average time of exposure of men before simple silicosis can be diagnosed is 7½ years; the shortest period of exposure is reported to be 2½ years." All the factors given—namely, kind and quantity of dust, physical characteristics, physical condition of the men, disease, age, and length of exposure—have an important bearing on the etiology of silicosis, but their importance varies with different localities, fields, and working conditions to such extent that it is probably better to consider them as a whole and say that under average conditions first-stage silicosis will occur in 2 to 10 years, and with unfavorable conditions this period will be reduced to as low as 2 to 3 years and probably less.

SYMPTOMS

The development of silicosis usually extends over a period of years and is so gradual that the early symptoms of the disease often are not recognized by those so afflicted. The slow progress in the development of the disease has caused obserers in this country and abroad to divide the disease arbitrarily into various stages. In the United States, silicosis is divided into three stages: first, second, and third. In South Africa the law defines the stages as antiprimary, primary, and secondary. An Australian report divides pulmonary findings into fibrosis increased, early silicosis, advanced silicosis, silicosis plus tuberculosis, and tuberculosis only. As this would indicate, the symptoms are somewhat different in the three stages, and for this reason the symptoms, physical signs, and x-ray findings will be given by stages.

First Stage. The objective symptoms in first stage silicosis are vague and more infrequent than would be expected from the definite lung pathology revealed by x-ray examination. In our own studies only about 18 per cent of the men admit any symptoms. The most common symptoms are cough, shortness of breath, expectoration, pain in the chest, and frequent colds, the last being the most prevalent. Some miners state that they have a cold during the entire winter. Objective symptoms and signs are not as frequent as would be expected. As a rule, the men appear healthy; they have ruddy complexion and are more robust than essentially negative subjects. There is a definite tendency for men with silicosis to gain in weight. This is most noticeable in the second stage of the disease. The men appear to stand more erect, and the muscular development is more noticeable than in negative subjects. This is not so marked in first-stage silicosis as it is in later stages. but is noticeable to a certain extent in the first stage.

The cardinal physical sign in silicosis is a decrease in lung expansion. The decrease in chest expansion is of relative importance and is not to be accepted as a literal finding, for it is well known that many men in excellent health have a small lung expansion. This is particularly true of the American negro. It is therefore necessary, in order to evaluate the findings from chest measurements, for one to have some previous information of the normal expansion of the man being examined. The chest movements, even in early silicosis, will be found to be less elastic than those of the

normal chest. The chest appears to have a retarded or "dead" movement.

Little is revealed on palpation of the chest in first-stage silicosis. On percussion it will be found in some cases that there is a slight change in the character of the percussion note. The chest has a "dead" sound which becomes very definite and occurs in a large percentage of cases with second-stage silicosis. Definite dullness may occur in the first stage, but it does not often do so. When noted, the dullness is usually found in the lower axilla region.

Ausculation reveals a definite difference in breath sounds, even in early silicosis. This sound is described by different terms and is usually referred to in our own work as a "rough" sound. The respiratory wave is a short, jerky, interrupted or metamorphosing inspiration with a prolonged expiration. The inspiratory sound is shorter than normal, and more harsh, while the expiratory sound is prolonged.

The changes in breath sounds are detected most easily over the anterior or lateral walls of the chest. It is our experience that this type of respiration occurs in 57 per cent of our cases. It is rather interesting to note that, with the marked pathology revealed on x-ray examination, rales rarely occur except in the late stages of the disease, when it is often complicated with some other condition.

X-ray findings. The diagnosis in the early stage is largely a matter of x-ray examination. It is well to call attention at this point to the fact that x-ray pictures of silicotic cases should be made slightly harder than chest pictures for tuberculosis. This is necessary to block out the general fuzziness and haziness occurring in a large number of cases. If this is done, the reader can classify the lung changes with more definiteness, and it lessens the number of differences between the clinical and x-ray findings. Although it is true that the x-ray gives a definite idea of the extent of the pathologic changes, the reader should have considerable clinical experience, for only with wide clinical experience can one determine the effect upon health and working efficiency with a fair degree of accuracy. The x-ray pictures in first-stage silicosis show the hilum shadows enlarged and very dense. In many instances they contain calcified spots much larger than those observed as a result of early tuberculosis. Following enlargement of the hilum shadows, the entire bronchial tree increases in density and can be traced to the outer margins of the lungs. Along the thickened bronchial tree, appearing first near the hilum, are small shotlike spots, sometimes described as "beads" or bronchial "buds." When the spots become noticeable throughout the lower section of both lungs, in this country it is regarded as the beginning of first-stage silicosis. The spots are fairly dense, about $\frac{1}{8}$ inch in diameter, discrete, and irregular in outline. As the disease advances the spots increase in diameter, number, and density.

Second-Stage Silicosis. The subjective symptoms in second-stage silicosis are more definite and constant than in first degree. The most common symptoms are shortness of breath, cough, expectoration, pain in chest, loss of strength, gastro-intestinal disturbances, and a definite tendency to frequent colds. The shortness of breath becomes very noticeable on exertion and is most marked in men with poor initial lung expansion. Cough is a fairly constant symptom in this stage. It is a characteristic dry, hard, irritating cough, occurring most frequently in the morning. Gastro-intestinal symptoms are quite common and often are considered by the patient to be the cause of the dyspnea. The symptoms most commonly complained of are indigestion, flatulency, and constipation. Pain in the chest is a frequent symptom and is usually located in the anterior section of the chest, near the bases. Patients usually consider this pain rheumatic in origin, and, unless they are asked about rheumatism, this symptom may be overlooked.

The objective symptoms in second-stage silicosis are definite and characteristic. The men appear to be healthy, to stand erect, and to be compactly built. They have a definite tendency to gain in weight. This is probably due, to some extent, to the age of the men, as silicosis is more likely to occur in those around the age of 40 or older than in younger men, but probably it is partly due at least to the slowing-up in the amount of work performed, due to the dyspnea.

Inspection of the chest shows it to be unusually thick. The intercostal spaces are no longer noticeable. The chest is rigid and appears to move as one piece, especially the upper part. Full inspiration is made with visible effort. The chest measurements show a decrease in lung expansion, but, as in first degree, this is not sufficiently marked to have diagnostic value unless previous information on chest expansion of the patient is available.

The percussion note in second stage shows a "dead" sound, as was referred to in first stage. Areas of definite dullness are more common in second stage than in first stage. Auscultation reveals the characteristic breath

sounds described in the first stage, but they are more definite in character and more common. Rales are not usually present, but when found they indicate some infection.

X-ray findings in second-stage silicosis show the hilum shadows to be large and dense; however, they display no more definite changes than are observed in first degree, if as definite. The "beading" or "budding" along the bronchial tree becomes larger, more profuse, denser, and clearer in outline. The chest may be best described as "mottled." The mottling is bilateral and about equal in density on both sides, indicating that the condition started on both sides at about the same time. The diaphragm is often humped in this degree.

Third-Stage Silicosis. In third-stage silicosis the diagnosis can often be made from the symptoms and physical signs only. The symptoms in this stage are the same as are given in the second stage but are very much more definite. The shortness of breath is marked and in many cases becomes distressing on the least exertion, such as disrobing, talking, and so forth. Manual labor is almost impossible, and, as the disease progresses toward its terminal stage, respiration becomes very shallow and difficult. In this condition the fight for breath overshadows all other symptoms. Cough is troublesome and occurs most frequently at night and in the early morning. The cough is sometimes relieved by vomiting and is more likely to be productive than in the preceding stages. Pain in the chest is a frequent symptom and in some instances is severe, but in most cases it is a dull aching pain. Gastro-intestinal symptoms are very annoying. Hemoptysis and night sweats are often noted in this stage but are considered to be due to tubercular or pyogenic infection.

Objective symptoms are often obscured in this stage by intercurrent diseases. Very seldom is the third stage reached without complication with some other disease. Consequently, the symptoms and physical signs of the intercurrent diseases may mask the symptoms and physical signs of silicosis. The patients with uncomplicated silicosis appear to be healthy, to have a ruddy complexion and to be of average weight; in many cases there is an increase in weight, and in some cases they may be termed "fat." The chest appears to be in full inspiration, with very little movement, breathing being largely diaphragmatic. The physical signs are similar to those noted in second-stage silicosis but are more definite. There is a definite decrease in lung expansion; the characteristic breath sounds of silicosis are always found. In this stage rales are more common than in the preceding stages, and are due to infection by other organisms.

X-ray findings. In the third stage of silicosis the spots described under "Second Degree" tend to coalesce, forming large areas of marked density, usually located in the midsection of the lung; these areas present the appearance of tubercular consolidation, are usually bilateral, and blend perfectly with the snowstorm appearance of the surrounding lung tissue. This appearance of x-ray findings usually makes differential diagnosis between silicosis and tuberculosis fairly easy.

PROGNOSIS

The prognosis in silicosis is favorable in the first and second stages, unfavorable in the third stage, and becomes less favorable when complicated with either tuberculosis or pyogenic infection. However, complicated cases of silicosis should not be regarded as always fatal.

TREATMENT

The treatment can be divided into curative and preventive. In early silicosis most cases will recover within 18 months to two years if removed from a dusty atmosphere. In advanced cases it is best to treat symptoms as they arise, to remove the patient from a dusty atmosphere, to regulate the diet, and to allow moderate exercise. Our observations of these cases extending over a period of years lead us to believe that these patients especially in the early stage, do much better if allowed to do light work. Even in the advanced stages, it is best to allow these men to be up on their feet as much as possible. This course tends to lessen toxic symptoms, makes the patient more contented, and in a number of instances, even in advanced silicosis appears to prolong life.

The preventive treatment is most important. Early writers advocated the wearing of bladders over the face to prevent the dust from entering the lungs. In late years various kinds of respirators have been advocated but for many reasons have been found to be of little value in decreasing the incidence of silicosis. At present three measures are advocated that have been proved to be of definite value. The measures are: (1) Reduction of the dust count in mine air to less than 300 particles per cubic centimeter of air; (2) the selection of the men that work in a dusty atmosphere by careful pre-employment examinations; (3) the yearly examination of men and the changing of those with early silicosis to positions free from dust, on the surface.

The control of the dust in the mine air is

largely an engineering problem, but the assistance of the industrial physician is usually valuable and is welcomed by most engineers. The most common measures used to control the dust are adequate mechanical ventilation, sprinkling the muck piles, roadways, walls, and roof at frequent intervals and in sufficient quantity to keep them thoroughly wet, wet drilling and blasting at the close of the shift only, allowing several hours' interval for the dust to settle before the men are permitted to return to the place. With these measures conscientiously carried out, the atmospheric dust count can be kept below that recommended as a maximum for safety.

The second and third measures for the prevention of silicosis lie largely in the hands of the medical profession. Pre-employment physical examinations of men should be required. The physical examination of men for such work should not only include a careful physical examination, but a blood-serum test, a sputum examination, and an x-ray picture of the chest. The examination should be as thorough as that obtained in the large diagnostic centers. This is necessary, not only to obtain information on the physical fitness of the men, but to dispel antagonism of the workmen toward a physical examination. As soon as the workmen realize that they can secure a physical examination equal to that obtained at some expensive clinic for themselves and their families, at their own medical center, their antagonism usually changes to active cooperation.

After entering the service of a company the man should be examined at least once yearly. This examination should be as thorough as the pre-employment examination. The purpose of this examination is to find the disease, in the early stages, when the chances for complete cure are best. By this method the effect of dust can be observed and men with early silicosis placed at work in an atmosphere free from dust, or, in the absence of such places, they can be persuaded to leave the mines.

The results of the examination should be placed on a card, which is given to the man to be given to the party hiring him. The men should be classed according to the physical findings into grades that would convey to the foreman, or others hiring the men, information as to whether or not there are defects, such as an infectious disease, or a possibility of sudden death; whether or not there exist no defects that would interfere with work at any place in a mine; or that they are recommended for certain occupations only. The decision of the physical fitness of the men to be employed should always be entirely in the hands of the physician.

CONCLUSIONS

1. History indicates that silicosis originated from the localization of human industries in prehistoric flint factories.

2. The cause of silicosis is the inhalation of minute particles of free silica over a relatively long period of time. Certain physical defects and diseases apparently predispose to silicosis.

3. In this country the disease is commonly divided into three stages; namely, first, second, and third.

4. The symptoms and physical signs of silicosis are vague and indefinite in the early stages, but become more constant and definite in the second and third stages. When present, the symptoms are shortness of breath, cough, expectoration, and a tendency to frequent colds. The cardinal physical signs are decreased lung expansion and the characteristic breath sounds.

5. The x-ray findings in silicosis are characteristic. The changes usually start near the hilum shadows, with formation on the bronchial tree of what are called "buds." As these extend throughout the lower section of the lungs, it is commonly called in America first-stage silicosis. With the coalescing of these spots into larger areas, it is regarded as second-stage silicosis. When these areas become sufficiently large to give a "snowstorm" appearance to the plate, it is regarded as third-stage silicosis.

6. Silicosis can be controlled and reduced to a minimum by reducing the dust content in the atmosphere below the standard set for safety, and by pre-employment and yearly examination of the man.

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THE TREATMENT OF PNEUMONIA WITH QUININE

(A Case Report)

ORVILLE HARRY BROWN, M. D., Ph. D.
Phoenix, Arizona

Case 21951, St. Joseph's Hospital, female, age 16, was admitted to the hospital 8:35 p. m., Feb. 18, 1931, with provisional diagnosis of influenza cold. The temperature on admission was 103.6. The following morning the temperature was 105 degrees, and ranged from 102 to 105 during the next three days. On the 20th slight but definite signs of lobar pneumonia appeared in the entire left lower lobe.

She had been ill four days before admission to the hospital and ran a persistently high temperature. About ten days before admission her tonsils had been removed. It was kept in mind that her illness might be a complication of the tonsillectomy. Except for the high temperature the findings were negative, however, until the signs of lobar pneumonia appeared.

The second day of her illness she was given capsules of alkaloidal quinine, five grains every hour for four doses and then one every four hours until she was taken to the hospital. She felt fairly well but the high temperature persisted; as she was not getting all the care she needed, she was taken to the hospital.

On admission to the hospital she was given intramuscularly the proprietary preparation of quinine, camphor and volatile oils, known as quicamphol, one ampoule every four hours for six injections. There was no more effect upon the temperature by the quicamphol than there had been by the quinine by mouth. The lungs, however, had not yet shown involvement.

Thinking that the invading organisms might be streptococci or other bacteria not susceptible to quinine, this was discontinued and sodium benzoate in large doses was given by mouth. On the first day of sodium benzoate administration the temperature fell from 105 to around 103; but the next day, with the sodium benzoate being continued as before, the temperature rose to 105 and remained constantly at that level throughout the day. The left lower lobe began to show definite signs of lobar pneumonia. The sputum examination on this day showed only pneumococci.

The sodium benzoate was discontinued and quicamphol was again given but this time one injection every hour for four doses and then every four hours until six injections were given. The temperature promptly fell within 12 hours to 99.4. That evening it rose to 100.8. The next day it fell to 98.0 and then ranged around 99 for two days, after which it was normal. The signs of the pneumonia faded away with the fever.

I recognize full well that a crisis might have occurred just as the hourly doses of quicamphol were started. My belief, however, based on similar experiences in a large number of cases, is that the quinine was effective in checking the pneumococcic process. It seems that the amount of quinine given her in the early days of her illness was adequate for holding the disease in check but not adequate for putting a stop to the growth of the pneumococci in the tissues. Likewise the quinine in the quicamphol given one injection every four hours was not adequate to kill sufficient of the bacteria to definitely check the disease. Definite signs of pneumonia did not appear until the administration of quinine was discontinued and the sodium benzoate instituted.

There are several possible explanations of the slow and inadequate action of the quinine on the pneumococci in this case. The patient was a large woman weighing around 180 pounds. The concentration of quinine in her blood may not have been sufficient to be pneumococcocidal. She also may have eliminated quinine with undue rapidity or her tissues may have absorbed it extremely slowly from her stomach. Then too the pneumococci affecting her may have been more than ordinarily resistant to quinine.

I am convinced that quinine has a highly specific toxicity for all true pneumococci. In a previous communication[1] I reported that 67 cultures of pneumococci taken from as many patients were destroyed within one to three hours by high dilutions of quinine. Pneumonia, tuberculosis and all respiratory tract infections should have the use of quinine thought of in connection with their treatment.

The hypodermic administration may be perferable, probably is in certain cases, to administration by mouth. I have used the dihydrochloride of quinine as well as the mixture known as quicamphol. Ordinarily mouth administration suffices. My way of giving it by mouth has been to give five grains of alkaloidal quinine each hour for three to five doses and then every four to six hours.

This case, a sample of my experiences, is reported to call attention to the value of sufficient quinine in pneumococcic infection.

1. Brown, Orville Harry: The Treatment of Pneumonia With Quinine, Southwestern Medicine, March, 1931, Vol. XV, p. 109.

CASE REPORT

J. A. RAWLINGS, M. D.
El Paso, Texas

I wish to present the following clinical case, which shows a malignancy of unusual interest.

Infant B. M., age 2 yrs. and 2 months, only child of young couple with negative Wassermann.

Child was nursed 6 weeks. Had measles at 6 weeks and was weaned at this time. Various foods were given and was finally brought up on Eagle Brand Milk.

The following is a letter from Drs. Camp & Camp describing the conditions.

"We have a boy 2 years old, who has an unusual condition of the head and face, which we think to

be an involvement of the bones. The alveolar processes are so much thickened that the roof of the mouth is only something like one-half inch across. The child is unable to close his mouth on account of the protrusion of the back teeth. The inferior maxilla is involved to almost the same degree as the superior. The cheeks protrude very distinctly. The left eye is pushed forward by some enlargement behind it and the tissues under it are quite dark. There is an enlargement in front of each ear and a row of nodules antero-posteriorly on top of the head. No involvement, that we have been able to find, of the long bones, or of any other bones except the ones mentioned. No skin lesions and no glandular involvement. The child had a very severe, acute sickness in November, 1930, with high temperature, vomiting, sore mouth and throat. Looked like he was going to die for several days. We fed him through nasal tube and gave him intraperitoneal

transfusions of father's blood. Patient has had no fever with this illness so far as we know."

In addition to the above information given by Drs. Camp & Camp, further inquiry from parents developed the fact that the child was ill for more than a month last November, temperature running from 104 to 105 with a bad infection of the throat, also both drums were opened and mastoid on left side involved but not opened. Throat was so inflamed that it was thought to be diphtheria and antitoxin was given. Child was so ill that its life was almost despaired of at this time, and as you know from Dr. Camp's letter transfusions were necessary. The condition has been described by Drs. Camp & Camp.

Figure 1 shows a full face view of this child, and Figure 2 shows the alveolar process and mouth.

Dr. Mott Rawlings has made a biopsy, removing a portion of one of the nodules on the head and will give a report of his findings.

J. MOTT RAWLINGS, M. D.: Specimen consists of a piece of tissue covered on one surface by epithelium and measuring some 5 by 5 by 3 mm.

A frozen section stained by hematoxylin and eosin is studied microscopically. The tissue how normal hair follicles markedly infiltrated with plasma-like cells. All intervening tissue is likewise infiltrated with great masses of these lymphocytic cells. On high powered examination mytoses are seen and some of these are found to be rather irregular in shape. The cells have a young appearance with central chromatin mass and smaller peripheral chromatin areas giving it the usual wheel or clocked appearance. The cells are massed together very densely and vary rather moderately in shape and

more especially in size, some cells being two to two and a half times the size of the smallest ones. The cells have the appearance of those belonging to the lymphocytic series of the plasma type. They appear to be rapidly growing and show evidence of only moderate differentiation. The tissue is in keeping with the diagnosis of lymphoblastoma of a rapidly growing type.

FINAL DIAGNOSIS: Lymphoblastoma highly malignant.

CASE REPORT

HARRY A. REESE, M. D.
Yuma, Arizona

In the August, 1914, number of Arizona Medical Journal you will find that I reported a case of Anencephalus. Some text book on teratology may be glad to secure these records; therefore, I am sending you herewith a report of another case. This is a case of Ectogenic Teratism which I found on August 18th, when I was called as health officer to sign a death certificate for a stillborn prema-

ture Yaqui infant. Here we have a complete absence of the lower jaw and tongue. The mouth is large enough to admit the tip of a finger. Protruding from the nose is a very small tongue shaped tag. The rudimentary ears are in a much lower position than normal. The left foot shows talipes valgus. The baby is a male, and was about three months premature. The mother is a multipara.

CEREBROSPINAL MENINGOCOCCIC MENINGITIS—SPECIFIC TREATMENT

H. P. MILLS, M. D.
Phoenix, Arizona

(Read before the Maricopa County Medical Society, Feb. 23, 1931.)

The specific treatment of meningococcic meningitis can be very briefly stated: the early, adequate administration, intravenously and intraspinally, of potent antimeningococcic serum, repeated at intervals of eight to twenty-four hours until the organisms have disappeared from the spinal fluid and the cell count is reduced to 1000 or less.

To enlarge upon the points mentioned. Early treatment is possible only in case of early diagnosis. If the diagnosis is made within twenty-four hours of onset and treatment with antiserum is instituted, a reduced mortality percentage will result. Every epidemic will show numerous extremely fulminant cases, due to extreme degree of bacteremia, that rapidly develop delirium and coma and become moribund before adequate treatment can be given. But most cases give symptoms of cerebrospinal involvement sufficiently early to suggest spinal puncture and the administration of antiserum if the spinal fluid is found cloudy.

Adequate treatment implies the administration of sufficient antiserum to counteract the bacteremia and meningeal infection. In most cases seen early, this should be given both intravenously and intraspinally. Test for sensitization to the serum should be made by injecting 1/10 of 1 cc. intracutaneously. If there is no reaction, 100 cc. of antiserum may be given intravenously, best diluted with equal amount of saline solution. This should be given slowly, watching for evidence of anaphylaxis and with adrenalin at hand, ready to be given on the first sign of reaction. The intravenous injection should be followed at once by a lumbar puncture, draining the canal quite thoroughly, with the idea of inducing the flow of bactericidal substances from the blood stream into the meningeal spaces. From 20 to 30 cc. of antimeningococcic serum should be given into the spinal canal after each spinal drainage; or, if only a small amount of fluid is obtained, the quantity of serum should be 5 to 10 cc. less than the amount of fluid withdrawn. The intravenous injection should be repeated every eight to twelve hours for two to four doses; after forty-eight hours, spinal drainage and intraspinal administration of serum is usually sufficient, as after this period the stage of bacteremia has probably passed. This intraspinal treatment is to be repeated

at least once daily until organisms are absent from the fluid and the cell count is reduced to 1000 or less. Spinal puncture should then be done every two or three days, to control cerebrospinal pressure and to check against relapse.

If there is evidence of subarachnoid block, the cisterna magna route may be used for drainage and administration of serum. This procedure has been recommended as a routine method and as preferable to the usual lumbar puncture; but, unless there is definite indication, it would seem rational to avoid any unnecessary risks, as long as we obtain practically the same results.

Occasionally, intraspinal drainage is overcome, and headache and rigidity are increased and are not relieved by replacement of the fluid with antiserum. In these cases, there is usually excess secretion of fluid with comparatively low cell count and few or no organisms. By limiting the amount of fluid withdrawn and extending the time between punctures, the condition rapidly clears up.

The question of the potency of the antimeningococcic serum should be given consideration. A polyvalent serum is used and in most cases is efficient, but it is conceivable that, due to the many strains of meningococci, cases may be encountered in which the serum at hand may not contain antibodies for this particular strain. This is a question rather difficult to answer as regards a case under treatment, and usually it is advisable, if favorable response is not obtained promptly, that a change should be made to a serum from another source. If a culture of the organism from the case be obtained, it may be tested against the serum for the presence of agglutinins. If the serum agglutinates the meningococcus cultured from the fluid in high dilutions, we may be fairly certain that it contains antibodies against this particular strain. The question has been raised whether the activity of agglutination is a correct measure of the bactericidal power; but for practical use this test for the presence of antibodies is the most available and can be used without great delay. This leads to the suggestion that culture be made of the fluid at first examination, in order that agglutination tests may be made if the question of potency of antiserum arises.

This specific treatment, of course, should be supported by general treatment in the way of proper nursing, diet, and especially the forcing of liquids.

The results of specific therapy have been very satisfactory, reducing the mortality from 75 and 80 per cent to 31 per cent.

To repeat, for the purpose of emphasis. Specific treatment for meningococcic meningitis consists in the early, adequate administration, intravenously and intraspinally, of potent antimeningococcic serum, continued at intervals until its bactericidal effect is obtained.

Since the infection occurs so seldom in known contacts, and since the protection is so transient from the use subcutaneously of antiserum, it is not recommended for passive immunization as a protective measure. Active immunization has been tried by using subcutaneous injections of repeated doses of a meningococcic vaccine. This has not been accepted as of value, and its value, if any, is difficult to determine, on account of the small percentage of known contacts who acquire the disease.

PUBLIC HEALTH NOTES

J. ROSSLYN EARP, M. D., P. H.
Director New Mexico State Bureau of Public Health

LA GRIPPE AND INFLUENZA

In a health bulletin issuing from the middle west I read "La Grippe, which is a second cousin to Influenza". In France there is a disease called La Grippe but no disease called influenza. In England there is a disease called influenza but no disease called La Grippe. The United States uses both words, but how that can make two diseases passes my understanding! It is hard enough to know what is and what is not influenza without introducing the complication of a second cousin.

Many physicians have remarked that "influenza" in these endemic days differs from that of the great pandemic. Can it be that the fulminating cases of those days were due to secondary infection with germs, like the Streptococcus haemolyticus, that had acquired a quite unnatural virulence through years of subculturing in thousands—nay, millions—of gunshot wounds?

It is true that many other infections, especially perhaps intestinal infections, are liable to be confused with that of influenza. The confusion is bound to remain until more is known about the etiology of the disease. We know that New Mexico physicians will be conservative in their diagnosis. At the same time, we hope that they will not refrain from notifying cases of influenza on the ground that they are not like the acute cases of 1918. Uniformity of reporting is vital to epidemiological research.

YELLOW FEVER AND DENGUE

The epidemiology of influenza is today in much the same state as was that of yellow fever a hundred years ago. Dr. H. R. Carter's posthumous monograph, recently off the press, makes instructive as well as fascinat-

ing reading. This book has been added to the library of preventive medicine at Santa Fe and may be borrowed by any New Mexico physician who is willing to return it within two weeks.

Among the many diseases confused with yellow fever in the early days, dengue naturally occupies an important place. Conveyed by the same mosquito, Aedes aegypti, the two diseases are geographically allied. Dengue has had many pseudonyms: Coup de barre, at Guadeloupe; la fievre inflammatoire in Martinique; el trancaso, in Porto Rico; and so on. Under some of these names mild cases of yellow fever have doubtless been included; for yellow fever and dengue have more in common than their geographic distribution—the muscular pains, the saddle-shaped temperature curve and the filterability of the virus which in each case is present in the blood stream during the first three days of fever. Recent work at the Tropical Hygiene Institute of Amsterdam[2] strongly suggests that an attack of dengue gives a certain measure of immunity against subsequent infection with yellow fever.

THE CAMPAIGN AGAINST CANCER

It is interesting to learn from a recent conference with a representative of the American Society for the Control of Cancer, that success has already been achieved in the popularization of the early symptoms and signs of cancer, Patients are now coming in good time for diagnosis and treatment. On the other hand, knowledge regarding the treatment of cancer has advanced beyond our standard textbook and our standard practice. Cases are being treated by surgery that could better be treated by radiology, and vice versa. Cases that need both technics are being treated by one only. In order to offer to the medical profession the very latest information in the treatment of cancer, the Society plans to publish a series of monographs, each by an outstanding authority. Arrangements have been made to secure free copies of these monographs for every New Mexican physician who desires to possess them. Application should be made to the county health officer, who will arrange to distribute them as they are published.

(1) Yellow Fever: an epidemiological and historical study of its place of origin. Baltimore: Williams and Wilkins, 1931. Pp. 307. Price $5.00.

(2) Arch. of Schiffs—u Trop. Hyg., Sept., 1931, p. 497.

HOTEL DIEU (El Paso) STAFF MEETING

September 9, 1931

DR. W. L. BROWN presented two gallbladder cases, the first being a parallel to a very recent case:

A woman, 46 years of age, came to us with gallbladder disease. Preoperative diagnosis of gallstones was made. She was not especially ill at the time of operation, had never been very ill and operation was decided upon. At the time of operation, May 3, 1927, no gallstones were found, gallbladder normal to feel as well as in appearance; could be easily emptied. There was an adhesion running full length of gallbladder across to the hepatic flexure of the transverse colon. This adhesion was freed, whipped over carefully to cover raw surfaces; gallbladder was not opened and a general exploration of the abdominal cavity was made, prior to the work on gallbladder and found negative. Patient started to vomit following operation, became distended with reversed peristalsis, in spite of all we could do. She had a great deal of pain, distention continued, and the wound was reopened on the third day, May 6, 1927. The stump of the adhesion was attached to the hepatic colon, apparently causing obstruction from the point of angulation. As soon as this was relieved, gas rushed into the transverse colon. This area was again covered and no drainage done. Again, two days later, as no relief was afforded, McBurney's incision was made. Cecum was found greatly distended, and a large rubber drain was sutured in place. A great deal of bloody fluid and gas escaped. Two days later, May 10, 1927, enterostomy was made on the left side and a tube was put into small intestine. This gave no relief; patient died following day, May 11, 1927.

Second Case: A woman 48 years of age, admitted to the hospital May 17, 1931. Operation was performed May 18, 1931. Gallbladder was found to be about six inches long and the width in proportion. Stone the size of a small marble could be felt in the cystic duct, impacted, and could not be dislodged. Gallbladder was easily shelled loose from under the surface of the liver, leaving a long pedicle. The pedicle was crushed just under the stone, ligated with No. 2 chromic and a small rubber drain was used, wound closed in layers. It proved to be a very easy operation, with no shock or disturbing symptoms following the operation. The following afternoon her temperature was 102° and continued to rise as high as 104° a day or two later. Peritonitis promptly developed, with great distention, which could not be relieved. Absence of peristalsis sounds and vomiting began on the third day. Patient was given large quantities of salt solutions subcutaneously, including 3 per cent salt and glucose. Pituitrin and enemas failed. This indicated that she had peritonitis. On the morning of the day of her death enterostomy was made. Cultures were made from free abdominal fluid, which was dark straw colored with fibrinous deposits on the intestine—showed to be streptococcus. There was never any localized abscess or any evidence whatever of localization; intestines were greatly distended throughout with large patches of exudate—no frank but a great deal of dark, straw-colored fluid.

Discussion: Of course, the paramount question is the source of this infection. There is nothing about the gallbladder, clinically, to suggest any source of serious active infection. Fluid in gallbladder was not pus but mucilaginous. The gallbladder was called hydrops because it was dark and very thick, but without acute active inflammation. It was easily removed. Dr. Waite reports that he found small microscopic abscesses in the walls of the gallblad-

(Continued on page 584)

Southwestern Medicine

Printed by THE A. C. TAYLOR PRINTING CO., Phoenix, Arizona
Published monthly for the Board of Managers of the four constituent societies.

Volume XV | December, 1931 | No. 12

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THE SOUTHWESTERN MEETING

The detailed minutes of the Seventeenth Annual Meeting of the Medical and Surgical Association of the Southwest will be published next month. It was considered a successful meeting, though to the critical officers of the organization this annual event can still be improved upon. We seem to have lost the zest and enthusiasm on the part of the entertaining county medical society which once was the feature of this meeting.

The attendance at the meeting was very satisfactory for a year when many doctors feel they cannot get away from home. The scientific program was of a very high order and the Program Committee deserve every commendation for their efforts. The symposium on allergy was the best presentation of that subject we have heard in the southwest, and the remainder of the program was of the same high type. The few clinics given by the Maricopa County Medical Society were excellent and deserved better attendance. The hotel arrangements at the Westward Ho and the session hall were excellent, and the social features, deliberately curtailed by the entertaining society, were much more enjoyable than if they had been more elaborate and costly.

Bernalillo County Medical Society will be the hosts for the meeting in 1932, at Albuquerque. The amendment to the Constitution which was proposed at the meeting of 1930, providing for a president-elect, was adopted. The result of this will be that Dr. Jamieson will continue as president until the Albuquerque meeting, when the president-elect will take office. The officers of the Association are as follows:

Dr. W. R. Jamieson, El Paso, President.

Dr. F. D. Vickers, Deming, N. M., President-Elect.

Dr. W. A. Gekler, Albuquerque, First Vice-President.

Dr. Orville H. Brown, Phoenix, Second Vice President.

Dr. W. Warner Watkins, Phoenix, Secretary-Treasurer.

Drs. Willis W. Waite, P. G. Cornish, Jr., and E. Payne Palmer, Trustees.

PROFESSIONAL BUILDING IN PHOENIX COMPLETED

With the completion and occupancy of the Professional Building, in Phoenix, at 15 East Monroe Street, the medical and dental groups of that city see the realization of hopes of many years, in a high class professional office building, designed and constructed for their particular needs. This is the first strictly Class A office building in Phoenix. It is eleven stories in height, air conditioned throughout, with every modern convenience for the medical profession. It has three silent elevators, one of which will accommodate ambulance or hospital stretcher. It has a basement garage accommodating fifty cars.

The central ground floor and second floor will be occupied by the Valley Bank with entrance on Central Avenue. The corner space is taken by the city offices of the Santa Fe Railroad. On the Monroe Street side will be a prescription pharmacy which will be owned by Mr. Wayland, who was chiefly instrumental in perfecting the plans for this building. The third and fourth floors will be occupied by professions other than medical, such as attorneys, architects, engineers, and so forth. The upper seven stories have been rented by physicians and dentists and are already about ninety per cent leased.

The greater portion of the fifth floor is occupied by the commodious quarters of the Pathological Laboratory. The entire western

wing, with both northern and southern exposures, comprising five thousand square feet of floor space is taken by them, doubling the space formerly occupied by them in the Goodrich Building; the clinical laboratories have the northern exposure, the x-ray laboratories being along the southern side with dark rooms in the center. The remainder of the fifth floor is taken by the Arizona Dental Laboratory, the Tri-State Dental Supply Company, and the Associated Optical Company, with the private office of Dr. John C. Austin (dentist) opposite elevators.

On the seventh floor the western frontage is taken by the group composed of Drs. Orville H. Brown, H. D. Atwood, Trevor Browne, P. B. Hoover and W. L. Reid. On the southern side are the offices of Dr. S. D. Little, and Dr. H. M. Purcell will have offices there also. In the tower wing are the offices of Dr. A. J. McIntyre and Dr. Edgar B. Pease (dentist). Dr. R. M. Dunlap (dentist) has the east wing and along the north side are the dental offices of Dr. F. R. Smith, Dr. R. A. McCall and Dr. E. M. Pafford.

On the eighth floor the southern offices are occupied by Dr. Willard Smith, Dr. L. H. Thayer, Drs. A. M. Tuthill and Norman Ross and Dr. James L. Johnson. In the west wing are the offices of Drs. J. L. Borah and C. E. Borah (oral surgeons); in the east wing, Dr. Claude M. Moore (dentist) has offices and along the north side are the dental offices of Dr. Spillane, Dr. R. D. Creamer, Dr. P. J. Ritchie and Dr. L. D. Dameron.

On the sixth floor, in the western end will be the offices of the Southwest Clinic group, composed of Drs. E. Payne Palmer, Frank J. Milloy, Dudley Fournier, Chas. N. Ploussard and John H. White. On the south side are the offices of Dr. A. C. Kingsley, chief surgeon for the Arizona Industrial Commission; on the same side will be the offices of Drs. David M. Davis and John W. Pennington. In the eastern wing are the offices of Drs. W. A. Schwartz and B. L. Melton. On the north side are the offices of Dr. T. T. Clohessy and the dental offices of Dr. H. A. Berry and Dr. George H. Chiles.

On the ninth floor the west wing is occupied by the group composed of Drs .George E. Goodrich, Vernon Kennedy, J. D. Hamer, Robt. S. Flinn and A. A. Shelley. The east wing is occupied by Dr. Harry R. Carson and

Dr. Harry B. Gudgel, separate offices. On the southern exposure are the offices of Dr. Edgar H. Brown. Dr. D. R. Gaskins occupies the tower suite, and the northern tier has the dental offices of Dr. John Lentz, Dr. H. J. Jessup, and Dr. T. W. Firth.

On the tenth floor the west wing is taken by Drs. John J. McLoone and O. W. Thoeny. The eastern wing is occupied by Drs. Fred G. Holmes, Victor Randolph and Howell Randolph. The tower space is taken by Drs. H. K. Beauchamp, James E. Drane and T. E. McCall. The southern offices are occupied by Drs. Ketcherside and Shields and Dr. C. C. Craig. Dr. T. W. Woodman has offices on the north side, the remainder of which is occupied by the dental offices of Dr. H. H. Braxtan and Dr. Wm. A. Baker.

On the eleventh floor, the west wing is occupied by Dr. J. Madison Greer. The east wing is filled by the offices of Drs. Kimball Bannister, L. R. Kober and E. C. Bakes. The southern tier is taken by the offices of Drs. Louis and Palmer Dysart, Dr. Fred C. Jordan and Dr. F. L. Reese. On the northern exposure are the offices of Dr. S. I. Bloomhardt and Dr. W. G. Barackman (dentist). The tower suite is taken by Dr. C. B. Palmer.

An attractive and important feature of this building will be the medical library in the twelfth floor tower room. Here a beautiful room, thirty feet square, has been turned over to the Maricopa County Medical Society for the headquarters of the organization and their medical library. The society has already spent several hundred dollars in preparation of this library. There will be coming regularly to the library seventy-five or eighty medical magazines which will be arranged for convenient reference. The room has exposure on three sides, with large windows. The views from the room in any one of the three directions,—east, west or north,—are among the most beautiful to be found in the city.

HOTEL DIEU (El Paso) STAFF MEETING

(Continued from page 581)

der, but doubted if these could have contained streptococcus. Both of these cases were apparently easy cases, with none of the supposed danger signals of infection—gangrene, common duct obstructions, or anything of that sort. They were up walking around, were not sick to amount to anything at the time. Both walked into the hospital and they were the last cases that one would expect to prove fatal.

DR. GALLAGHER suggested that the source of infection in the first case might have been in the liver, culture from the liver might have shown this. Brief discussion of a streptococcic infection in an appendix, where a culture was taken. There was no evidence of infection, patient's temperature at operation was 99°, went to 104° in the afternoon and at midnight was 106°. Patient was given 150 grains of aspirin in 4 ounces of starch water by rectum and this was repeated in 4 hours. Temperature dropped and patient recovered. Another case of a rather thick gallbladder with stones, went home on the fourteenth day draining light yellow bile, though no bile could be found at operation. Four days later, temperature came up, there was chest dullness and pus. Rib resection was done and patient was recovering nicely; no drainage of bile since operation.

DR. GARRETT said that he occasionally sees, from a medical side, these cases who have temperature after operation. Two cases recently seen who had temperature before operation. One woman gave a history of several attacks of abdominal pain with fever. Gallbladder was removed, temperature went to 103°, with a chill; there was no evidence of stones, no jaundice; temperature went to 104° and patient had a very stormy time for several days and almost died. Infection was either from liver or gallbladder, since either will filter bacteria when it ceases to act. In some instances, vaccines are being given in gallbladder operations to raise the patient's resistance; glucose and sugar are also used to increase the resistance.

DR. BROWN was of the opinion that the use of vaccine in the Mayo Clinic is mostly an experiment before colon resections, where there is danger of colon and streptococcic bacillus combined.

DR. CUMMINS asked what would be revealed by a study of gallbladder surgery in different hospitals for the past 5 years. The mortality in gallbladder surgery is high; what is the cause? He then gave a brief outline of the recent result of studies along this line by different authorities.

DR. WAITE discussed two deaths, one following gallbladder operation and duodenal ulcer; the second, removal of the uterus. There was some streptococcic infection somewhere, probably pockets of microscopic size abscess which planted streptococcic infection on the raw surfaces. The mortality rate in prostate cases used to be high; that has been lowered, considering the seriousness of the case, by proper preparation of the patient before operation. Any patient past 45 years of age is entitled to blood chemistry before operation. A high blood sugar aids the spread of infection. The use of glucose may not be so good unless used with insulin. At any rate, lower the blood sugar and the danger of spread of infection is lowered.

EL PASO COUNTY MEDICAL SOCIETY

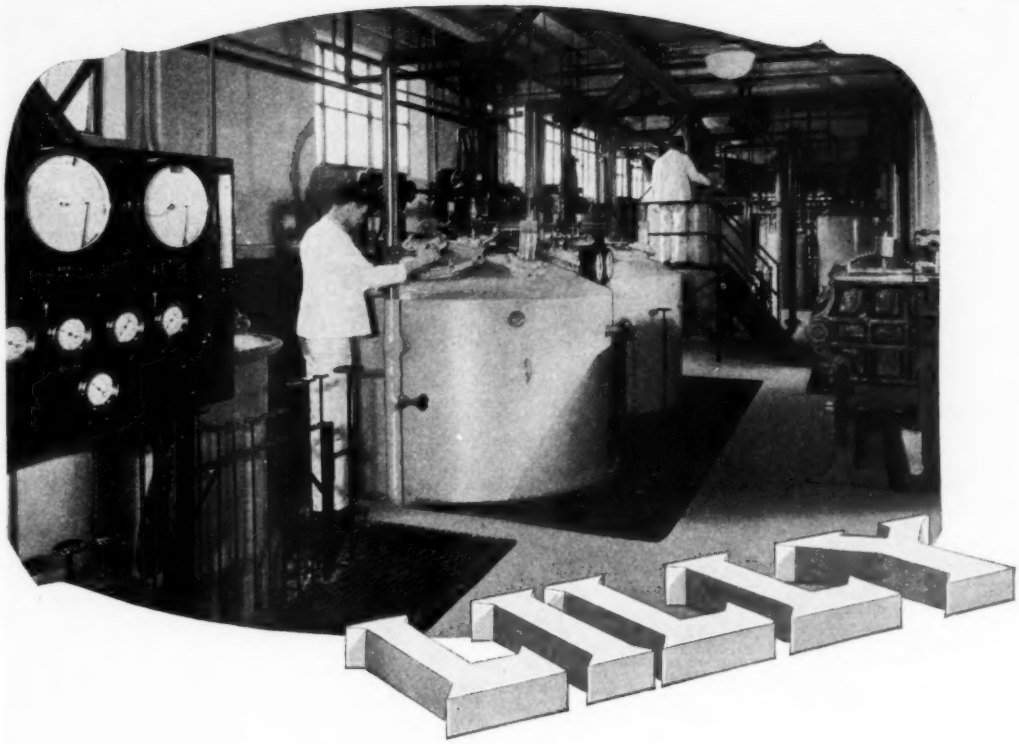
Meeting of September 28, 1931.

Meeting called to order at 8 p. m., by the president, Dr. J. W. Laws. There were present 44 regular members, 8 army physicians and 2 visitors. Minutes of the last meeting were read by the secretary, Dr. Ralph Homan, and approved.

DR. HARRY LEIGH presented two thymus cases, babies, in each instance the second child born to young healthy parents, the first child having died suddenly.

First case: Child, Mexican, age 1 year, exceptionally well nourished, with large, nicely formed chest; angelic type of child. X-ray taken simply because parent's first child had died suddenly, shows heavy upper thoracic shadows. No symptoms except a little hoarseness. The first child of these parents nursed beautifully and was growing finely, but when about three years of age someone persuaded the parents to have a tonsillectomy done and with the first whiff of ether, the child died.

Second case: Child, American, about 1 year of age; had been very thin but has now filled out some and is coming along nicely. This child has a



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PROGRESS THROUGH RESEARCH

high chest and rotund body, which is nearly always seen in this type of case. A great many of these children are short necked and heavy. Skin is very transparent and seems almost clear. X-ray shows very heavy upper thoracic shadows. The first child born to these parents was delivered after an unusually easy labor, but the following Thanksgiving the child was having convulsions, was very cyanotic and was sent to the hospital where a diagnosis of cerebral hemorrhage was made. It made a remarkable recovery and afterwards did beautifully, growing nicely and was getting fat. One day it developed a respiratory infection and the parents sent for me. I was pretty busy on a case at the time and could not go just then, and as they said the baby looked bad, I had them bring it to the hospital. Later, when I arrived, the child was dead, having developed a cerebral hemorrhage apparently without adequate cause.

In general, I personally feel somewhat skeptical about the thymus being responsible for any condition because physiologically we have never been able to demonstrate it. However, in children, in these cases of sudden death, we find a very large thymus, sometimes 70 or 80 to 100 gmns., also large spleen and at times glandular enlargements. What this has to do with it we do not know, but at any rate we do know that these children may develop some severe infection, be extremely sick, then recover and become apparently well, only to have some little thing happen several weeks or months later, a sudden cold develop perhaps, and death ensue. Nearly all the beautiful children of the angelic type, with beautiful bodies and tissues, transparency and fineness of features that make them so ideal for painting, show large thymic shadows, and each child of this type is a potential case. The case where there are no symptoms is the difficult one to handle, as sudden death frequently ensues. Where there are symptoms and we know with what we have to deal, under x-ray treatment with ordinary supervision, they respond beautifully. I have become very interested in this subject because I have seen several children of this type die and think the surgeons, especially the nose and throat men, should be particularly careful with them as they are the ones who seemingly die without any hesitation and without any signs of infection. I do not know what the thymus has to do with these cases, but it seems to be about the only trademark we have by which to identify them.

DR. J. W. CATHCART stated that since January 1930, they have treated 21 cases of this type. They are seen only two or three times and as far as is known, they uniformly heal as the mothers do not return complaining of the cyanosis and breath-holding. When they first come in, they are extremely worried about the child, so when they do not return it is safe to assume that their fears have vanished. This seems to be one thing that yields very easily and readily to x-ray treatment. The technic, however, is hard to demonstrate.

DR. BRANCH CRAIGE: I have been very much interested in thymus myself, but do not believe this train of symptoms has anything to do with this thymus. I recall that a very thorough study of this subject has been made by Dr. Boyd, of the University of Minnesota. She was invited to come to Washington to discuss the thymus. She started work in pediatrics and became interested in thymus cases, had x-rays made on hundreds of children, both normal and unhealthy children, and found that those children with a large thymus, were large, well-nourished and healthy, while the undernourished and sick child had a thymus probably one-third the size of the child who was well-nourished and healthy. The difference in the size of the thymus is greater than in any other organ of the body, sometimes varying as much as 40%, while other organs average 15%. In view of all her experiments Dr. Boyd came to the conclusion that symptoms of status lymphaticus had nothing to do with the large thymus and that there is no relationship between the two.

Further interesting discussion was contributed and participated in by Drs. J. Mott Rawlings, J. Leighton Green, C. F. Rennick, George Turner, W. W. Waite, F. O. Barrett, Branch Craige, G. Werley and Dr. Leigh.

DR. R. B. HOMAN reported a case of carcinoma of the lung, stating that early in the disease it was a little difficult to make a diagnosis—to differentiate between tuberculosis and a tumor. A very complete series of x-ray pictures was taken, however, which in the end proved conclusively the correctness of the diagnosis. Male, 48 years of age, family history irrelevant. Personal history: At age of ten had an illness diagnosed as typhoid fever and recovered from that with the exception that he had bronchitis and a cough which remained with him as long as he lived; otherwise, apparently in good health until in the summer of 1930. About July, he noticed his cough was becoming more intensive, giving him quite a bit of trouble and this increased until in September he presented himself to one of the clinics in central Texas for diagnosis and advice. Routine examination revealed nothing except a generalized bronchitis. X-rays taken then showed nothing, but rather a thickened hilus on each side. He was advised to take an autogenous vaccine for his bronchitis, and to have his tonsils (which were somewhat enlarged), removed, which he did not do.

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Medical Director

He returned to his home but did not improve and went back again in November to the same clinic, when additional examinations were made with practically negative results. Sputum examined at this time was negative for tuberculosis. Early in December he returned again, and x-ray pictures then showed he had developed indications of tuberculosis. No trace of the organism could be found, however, but nevertheless he was advised to go to an institution, so he came to El Paso and to us. The condition progressed rapidly and he died in June. Autopsy made by Dr. Waite revealed the presence of tumors which had originated in the bronchus and spread out into the lung tissue.

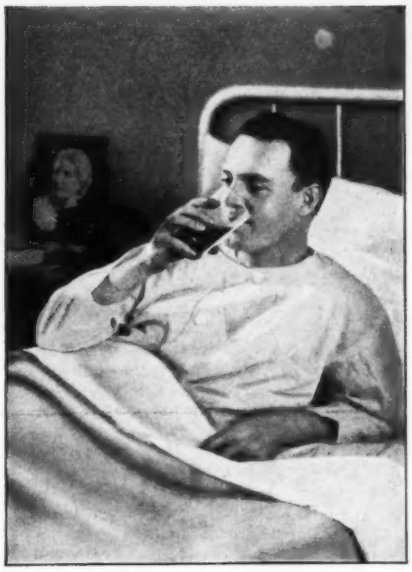
DR. ORVILLE EGBERT: I had a case which came to autopsy the day following that of Dr. Homan's. This was a man, 58 years of age, who came to us from New Orleans, carrying a diagnosis of tuberculosis, because of a severe cough, but he was clinically a picture of decompensation, with marked dyspnea, and his ankles were as large as thighs. Heart sounds were faint, in fact nearly all normal sounds of the chest were obliterated. Autopsy in this case was also made by Dr. Waite.

DR. W. W. WAITE: These were both very interesting cases and the thing that interested me most without going into details, were the tumors, primarily of the epithelium of the bronchus. Dr. Homan's case was of the squamous cell type, and was a much slower growing case than that of Dr. Egbert's, which was much more virulent, with considerable pain going way up in the neck. Dr. Homan did well to have so many x-rays taken, because there is probably not one x-ray which, taken by itself, would be sufficient for a person to venture a diagnosis, but when you see the series, they show very plainly.

DR. E. G. EARNHEART: I saw Dr. Homan's patient the first time he came to the sanatorium and surely commend Dr. Homan for his diagnosis in this case. He had been there only a short time when Dr. Homan made an almost positive diagnosis of malignancy. One thing very characteristic about the symptomatology was the constant and persistent dyspnea that he had throughout and the nonproductive distressing cough. Many times driving to the sanatorium, before I could get inside the yard, I would hear the man's cough, which was the most distressing of any patient we had in the sanatorium.

DR. J. W. CATHCART: In regard to Dr. Homan's case, I saw the pictures early in the game, but was not sure what the condition was. It looked like active tuberculosis and there was nothing characteristic of malignancy so far as I could see. On the other hand, Dr. Egbert's case was a clear cut one.

DR. W. A. GUYNES presented a paper on Chorea Gravidarum, including a case report, in which he termed acute chorea as an acute infectious disease, characterized by involuntary coarse muscular twitching, psychical changes and a propensity to endocarditis and polyarthritis. The exciting cause is thought to be a non-hemolytic streptococcus, which produces toxin and by its action on the brain and basal ganglia produces the symptoms characteristic of the disease. The disease is more frequent in children, being rare in adults except during pregnancy, which predisposes to it, and favors a relapse in women who have had the disease previously. The pathology is a low grade meningoencephalitis, which is thought to be so localized in the basal ganglion that it produces the specific movements. There is also congestion and hyperemia of the brain and meninges. Emboli are frequently found in the brain and probably originate from the endocarditis, but these emboli are not the cause of



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the specific movements. The cardinal symptoms are choreic movements, which are spontaneous, irregular, involuntary jerks and twitches of various parts of the body, various psychic changes, ataxia, and weakness, the patient being unable to maintain a tonic muscular contraction. The disease must be differentiated from hysteria, tic or habit spasm, epidemic encephalitis, senile chorea, Huntington's chorea, Friedreich s ataxia and various intoxications.

DR. WAITE: It is difficult to imagine how we could get such violent symptoms with so little pathological change. If some of these cases could be studied by the most advanced technic for studying brain tissue, we might be able to find more than we do now. Here again we must get down to the fact that the heart is the organ that is probably the first involved. We see a good many hearts in a condition that might have been due to a rheumatic infection. When you get a case of acute rheumatism and the doctor says the heart is not yet involved, I think the thing to do is to assume the heart is already involved and work on that basis rather than to say as yet there is no heart involvement.

DR. G. WERLEY: I think that Dr. Waite's contention that rheumatism is primarily a heart disease can be narrowed down to where it is primarily a vascular disease. I believe that Dr. Waite will agree that the lesions are really connected with the vascular blood supply to the heart. Joint manifestations of rheumatism are vascular and due to the irritation of the vascular supply about the joint and that is what causes the effusion into the joint. Rheumatism is a general disease.

DR. S. H. NEWMAN: Somewhere I have read that 90 per cent of all cases of chorea that have temperature over 100 show heart involvement. For that reason we went over the heart very carefully in the case reported by Dr. Guynes, but were unable to find any murmur. Autopsy proved, however, that the mitral valve was involved.

DR. J. L. MURPHY presented two case reports.

Case 1, male, 49, injured three years before he came to Dr. Egbert, on Jan. 17, 1928, when thrown on the brake wheel on a box-car, injuring abdomen. Had two profuse hemorrhages from the bowels, losing approximately three quarts of blood at the time. In April, 1928, tumor mass developed in upper abdomen, continuing to increase in size. In Feb. ruary, 1929, exploratory operation was done in Topeka, Kans., hospital, and two gallons of fluid removed, tuberculous in origin, confirmed by microscopic examination. In October, 1929, he returned to the Topeka Hospital and was injected with three pints of oxygen, which gave him much discomfort, but he has been doing nicely since then, though unable to work. The patient then came to us with the idea of an exploratory operation which was done and at the time of operation the entire peritoneum was studded with clear tubercles, some of them of grape formation, and a big tumor mass in the epigastrium; stomach could not be made out as a separate organ. It was just a complete mass, with another mass extending down the left side into the pelvis, which could not be moved. At the time of operation we thought it was tuberculous, generalized from the peritoneum. Considerable fluid was removed at the time the abdomen was opened; section was taken which Dr. Waite reported as mucoid carcinoma.

Case 2, female. Noticed tumor in upper right quadrant, freely movable, not tender. Loss of appetite practically only symptom, but became quite weak and unable to work, so came to the office for examination. Dr. W. L. Brown felt that tumor had nothing to do with the general condition. Stool

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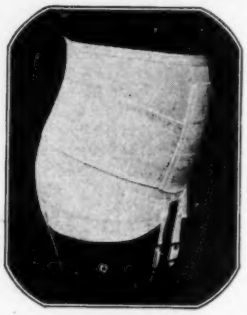

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examination showed no blood, no mucus or pus, hemoglobin was gradually decreasing, had gone down from 70 to 60 to 55. Patient was advised to take a rest in California, which she did, and while there developed a terrific pain and enlargement in abdomen, but stated after two or three days without any specific treatment, she recovered. When she came back here the tumor had grown in size and was freely movable, but apparently causing no trouble. Unfortunately we did not make a barium enema examination, so were at a loss as to the origin of the tumor. Exploratory operation, on opening abdomen showed carcinoma of the transverse colon. Patient has now recovered from the effects of operation and has left the hospital.

DR. ORVILLE EGBERT: The first case reported by Dr. Murphy is that of a Santa Fe railroad man. When the belly was opened here, I took one look and thought it tuberculous peritonitis, and so did Dr. Brown. Dr. Murphy said it did not look just right to him, and it was not right. Here was a man 44 years old, who never had tuberculosis before. Developing tuberculosis at 44 or 45 is very rare, and then, that the tuberculosis should primarily be in the intestinal tract, would make it doubly rare. Usually tuberculosis of the abdomen is secondary to pulmonary tuberculosis.

DR. F. D. GARRETT: These cases are very interesting, especially the first one. I remember some years ago I was called to see a man, who had always been very well and strong up to a few months before. He commenced losing weight, developed pain in the abdomen and his condition was rather bad when I saw him. He insisted on being up and about when he should have been in bed. We were not able to make out any distinct mass in the abdomen, but I secured a small specimen from the stomach, which showed some blood microscopically. I wrote back to the doctor it was probably carcinoma and asked him to bring the man down for further observation. I heard nothing further about the case, but sometime later I happened to be in the hospital one day and saw the patient there. An incision had been made in his abdomen and it was covered with what appeared at first sight to be tubercles, but knowing the history I suggested carcinoma. It turned out that way and the man died in about two weeks.

DR. J. W. CATHCART: The man referred to by Dr. Murphy comes around every little while and has an x-ray taken. He was in two weeks ago and disappeared after we took a picture. He does not seem to be changing very fast; there is plenty of tumor there.

DR. W. W. WAITE: These are very interesting cases. We had a case several years ago, but he had no x-ray treatment. We watched him until he died and then did a postmortem. It was nearly all tumor and had not metastasized anywhere, just filled the entire abdomen; all the creases and little places were filled with tumor growth. We have had a lot of this to examine for diagnosis. Where these tumors originate, I do not know, but imagine it is somewhere around the stomach. The other type of case originates in the large intestine, with not much connective tissue around it and is probably a low grade malignancy, but the type of tumor called mucoid carcinoma. The cells stain better in this type than they do in the other.

EL PASO COUNTY MEDICAL SOCIETY

Meeting October 26, 1931

The meeting was held in the Crystal Ball Room of Hotel Hussman and was called to order by the President, Dr. J. W. Laws, at 8 p. m. There were

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present 43 regular members, 8 from Fort Bliss, and 5 visitors.

Minutes of the previous meeting were read by the Secretary, Dr. Ralph Homan, and approved.

Dr. Homan read a communication from Dr. R. L. Powers, Secretary of the Lubbock, Texas, County Medical Society, relative to the transfer of Dr. H. F. Miller, of Clayton, Texas, from that Society to the El Paso County Medical Society. Motion was made, seconded and carried that Dr. Miller be accepted as a member by transfer.

DR. W. E. VANDEVERE presented a case report—Mexican girl, 7 mos. old, who had experienced difficulty in swallowing food, had strangling spells, would get choked and could not sleep. X-ray showed a safety pin in uppuer end of esophagus, with point turned up. Dr. Vandevere displayed x-ray pictures showing various positions of the pin and explained the procedure used in extracting same.

DR. E. W. RHEINHEIMER presented a paper on Hypertension—Etiology and Prognostic Tests—in which he brought forth that anything that tends to decrease the lumen of the vascular bed, or to interfere with its elasticity, or to increase the peripheral resistance, usually raises the tension within that bed, and that the peripheral resistance of the arterioles of the general circulation measured quantitatively was twice as high in a group with hypertension as in a normal control group. The change in lumen may be more or less restricted to a certain organ or area, as in the case of the renal type of hypertension; it may involve practically the entire vascular tube as in a general arteriosclerosis, both of which cause varying degrees of elevated pressure ordinarily. In the senile type, however, usually involving the larger vessels, the blood pressure may be within normal limits; it may also be of that obscure type, probably the most common and least understood—essential or benign hypertension or hyperpiesia, in contradistinction to the arteriosclerotic type. A fourth type sometimes mentioned is the accidental, associated with some types of heart lesions. Definite causation of hypertension has not yet been determined. In the renal sclerotic type, definite pathological changes are found in the renal vessels and the elevated pressure is probably compensatory to force the blood through the narrowed vessels. The same is true to a lesser degree of the general arteriosclerotic type, especially when there is considerable involvement of the smaller vessels. In the essential type no definite demonstrable changes are found in the blood vessels, but there is evidence that it is dependent upon a vasoconstriction of the arterioles and many agree that if a higher pressure be maintained over a considerable period of time a benign type will in many instances lead to a secondary sclerosis. Some consider essential hypertension not as a separate entity, but as a form of renal arteriolitis and therefore a renal hypertension. Various theories as to the causative factors were offered, but the etiology of hypertension is complex, and as yet no single operative factor of these proposed can be made responsible.

Dr. Rheinheimer described an amyl nitrite test, reported by Stieglitz, to determine the degree of relaxability of the arterial walls as an aid to prognosis and as a denominator of the degree of vascular disease. "Spasticity and hypertonicity, early phenomena of the progressive disease are amenable to treatment and cases encountered in this stage offer a relatively good prognosis, while if sclerosis is present the change is permanent, not so amenable to treatment and with a less hopeful prognosis. To apply this test the individual's pressure is deter-

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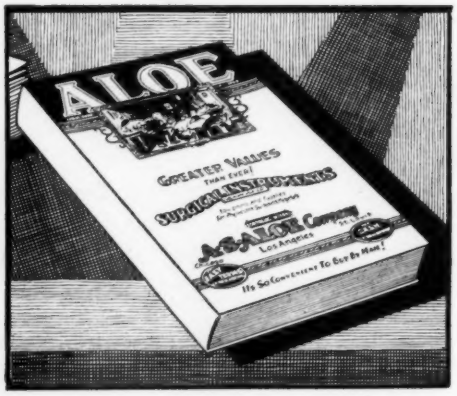

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mined as accurately as possible after which the contents of one pearl of amyl nitrite are inhaled deeply three or four times. When the maximum effect is reached, manifested by flushing of the face, a sense of fullness in the head or vertigo, the blood pressure is rapidly determined two or three times, after which the disagreeable effect can be lessened by the use of aromatic spirits of ammonia. The fall of the systolic is noted, but of more importance is the degree with which the diastolic approaches the normal. This percentage of the approach of the diastolic to the normal measures the degree of resistance or indirectly the degree of sclerosis." Dr. Rheinreimer to determine the effectiveness of this test during the past seven months applied it to 27 cases of hypertension of various classes, indicating the results on an accompanying chart. From these he concludes that the Stieglitz amyl nitrite test seems a fairly reliable method for quickly determining the relaxability of the vascular walls and thereby giving indirectly an estimation of the presence or absence of sclerosis and the degree if present.

DR. E. A. DUNCAN followed wtih an excellent discourse on the same subject, illustrating with lantern slides, various phases occurring in treatment.

Discussion of the papers followed, participated in by:

DR. G. WERLEY, mentioning successes claimed in reducing high blood pressure by use of epsom salts, salt-free diet and other methods;

DR. PAUL GALLAGHER, difficulty encountered in reducing those who are overweight. He thought a vegetable diet best, as one gets a reduction of 1½ to 2¼ lbs. per week therefrom, the fat falls off, and the patient will continue to come in for abservation.

DR. C. R. BAKER asked if one's normal blood pressure is that pressure at which the individual human machine runs along most smoothly;

DR. J. MOTT RAWLINGS understands that persons with high blood pressure or hypertension have associated with it constipation of rather a specific type, and are sometimes greatly relieved by the use of belladonna in small doses;

DR. ROBERT THOMPSON asked what success has been had with the alkaline-ash diet;

DR. N. H. KELLER believes hypertension should be divided into three classifications: (1) renal involvement, (2) arterial sclerotic type, (2) essential hypertension. A good test is to take the blood pressure and then put the patient to bed for three days, taking the pressure at the patient's home each day;

DR. G. WERLEY, perhaps a high protein diet has something to do with high blood pressure, and should therefore be cut down. In all experiments carried on in animals in connection with producing arterial sclerosis, even in a short-lived animal like the rabbit, it takes from one to two years to produce results, so to make proper tests on a human being, it would probably require from 20 to 30 years to note the true effect. Reducing blood pressure does no harm, though many theories have been brought forth that a certain amount of pressure is necessary to the well-being of certain individuals. It is important to run a control on these cases, if this be possible. In a few cases he has been able to follow over a period of three or four years, he has found a great variation in pressure.

Closing discussion, DR. RHEINHEIMER referred to the essential type, wherein if the condition continues, a general sclerosis results, with hypertonicity, muscular weakness and muscular degeneration. He does not know if the test he discussed has any value or not, as sufficient length of time has not

THE ROBINSON CLINIC

Brain tumors are more prevalent than the profession realizes. Routine autopsies performed on all patients who die in the City Hospital in Vienna showed that one out of four thousand cases had some type of cranial neoplasm. In other words, in every community of ten thousand people, there are at least two people suffering from a brain tumor.

With this fact in mind, every effort should be made to diagnose and localize these tumors before it is too late, always remembering that few cases are typical until after the optimum operative period has passed.

The classical triad of headache, vomiting and choked disc is seldom found in entirety The presence of one of these conditions with gradually progressing neuro-logical symptoms, is sufficient to warrant the diagnosis of potential tumor, and every step should be taken to determine the presence and location of a tumor mass.

Surgery is the only adequate therapy. X-ray should never be used until after operation, as some types of glioma are activiated by radiation and in all types, oedema is produced, that will invariably aggravate the patient's symptoms and may even cause death.

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elapsed to tell in his series of cases, but several have responded in such a manner that he thinks well of it.

DR. DUNCAN referred to the difficulty in regulating the diet, especially a salt-free diet, which is practically impossible unless the patient is in an institution. Our late Dr. Stark used the alkaline-ash diet and was very enthusiastic over it. He knew nothing about the use of belladonna, brought up by Dr. Rawlings. As to putting the patient to bed, this is quite difficult to do even if they are ill, and extremely difficult when not sick. Most of these patients are not sick in a strict sense of the word, they are active and want action, and usually insist upon being up and around.

DR. F. D. GARRETT presented a paper entitled Anaphylaxis—An Important Cause of Abdominal Pain and Digestive Disturbance.

Discussion was participated in by DR. W. L. BROWN, who told of his interest in the gallbladder cases reported by Dr. Garrett, one of which was a typical neurotic case. Dr. Garrett worked over it sometime and finally removed the gallbladder, which succeeded in quieting the patient for several months. Then she began to have the same symptoms and after about a year went to the Mayo Clinic where they were unable to find any explanation for the attacks of pain. Dr. Judd was interested in the case and while there she had a hemorrhage from the bowels. The second case was on the same order, with neurotic symptoms. There was something about it that made me a bit fearful and I returned her the first time after she had been referred to me for operation. She came back a few months later and I operated on her. She had no gallstones and no evidence I could see of a diseased gallbladder. These were both outstanding neurotic cases.

DR. ORVILLE EGBERT: Dr. Gibson has run quite a number of food tests in just the type of cases that Dr. Garrett has described and it has been rather striking that in the institution cases that might be diagnosed as tuberculous enteritis have been quite frequently relieved by food control, restricting those articles of diet to which the patients were sensitive. The more you see of tuberculosis, the more you feel that allergy plays a most important part in the disease.

DR. J. J. GORMAN: Dr. Garrett has brought attention to a class of cases that are very frequently unnecessarily operated. I think we are all perhaps guilty of referring cases to the surgeon who later may come back with the same symptoms. It is doubtless valuable to resort to food tests in this type of case in order to gain further information; however, negative food tests do not prove all foods to be innocent, and those which are guilty but do not show by the tests may be eliminated by test diets. Presence of bacterial infections should be properly studied.

DR. G. WERLEY: A great deal of work has been done in connection with headaches lately to show that headaches are due to allergic spasms of the vessels in the brain.

DR. N. H. KELLER: : You will find occasionally in certain susceptible persons, suffering with indefinite abdominal pains, intestinal thyroid. Under x-ray radiation a good deal of these intestinal symptoms disappear.

DR. GARRETT (closing): I have never been very enthusiastic about food tests and feel that the man doing that kind of work should have his patients under very close observation to get anywhere with it, while the man who does it occasionally and is not able to follow his patients very closely, must have a great deal of difficulty in determining his results. Pain without symptoms is very frequently noted. Many of these cases for years will have abdominal pain and not have irritation or eruption, but some day this will appear and make the diagnosis clear.

Dallas Southern Clinical Society News

Throughout the past several months, the various branches of the Program Committee have been diligently working on the plans and details of the program for the Fourth Annual Spring Conference of the Dallas Southern Clinical Society which meets in Dallas, March 28th to April 2nd, 1932, inclusive. A most elaborate program has been planned. Twenty distinguished guest speakers, men of outstanding ability as teachers throughout the United States, have already accepted our invitation to appear in general assemblies, hospital clinics, and the popular round table luncheons. Every field of medicine is thoroughly and adequately covered, and covered in such a coordinated way that the doctor who attends will be able to arrange a course of postgraduate study far superior to any that he could obtain by making trips all over the country. The evening entertainment throughout the Clinical Conference offers many outstanding features. On Monday evening, Dr. Edward H. Cary, President of the American Medical Association, will make the Welcome Address before a general assembly which will be open to the public. Dr. Thos. R. Brown, Professor of Gastro-enterology at Johns Hopkins University, will speak on "The Story of Digestion—Indigestion.' Dr. Frank L. Lahey, of Boston, will talk on "The Thyroid Gland." Dr. Joe. Collins, of New York, will talk on "How Can We Stem the Rising Tide of Insanity in This Country?"

On Tuesday evening there will be a symposium on "Diseases of the Biliary Tract" by Dr. Thos. McCrae, of Philadelphia, Dr. J. Shelton Horsley, Sr., of Richmond, Va., and Dr. Merrill C. Sosman, of Boston. On Wednesday evening a brilliant clinic dinner will be held, and many special features of entertainment are being arranged.

On Thursday evening two symposia will be held, one on "Arthritis," featuring Dr. John A. Kolmer, of Philadelphia, and one on "Conservation of Maternal Health," featuring Dr. Edward H. Richardson, of Baltimore.

The Clinical Society is continuing its ninety-six full one-hour periods of post-graduate work, and is arranging this part of the program in such a manner as to prevent, as near as possible, conflicts between medical and surgical topics.

The popular Round Table Luncheons are to be held on five days, and are to meet in the following groups: Medicine, Surgery, Pediatrics, Eye, Ear, Nose and Throat, Urology and Orthopedics.

Another special feature has been added this year in the form of Hospital Ward Rounds and Surgical Operative Clinics. These features will be conducted by local members of the Dallas Southern Clinical Society on Friday afternoon and Saturday morning.

The "Prospectus" will be ready for mailing about January 1st, and the complete program will be mailed to all the doctors of the Southwest about March 1st, 1932. Truly the Dallas Southern Clinical Society is offering the most elaborate program of post-graduate study that has ever been made available to the doctors of the Southwest. The registration fee, which covers everything, remains at the usual price of $10.00. A number of registrations have already been received, and the various committees are confident of an attendance of at least two thousand next spring.

A cordial invitation is extended to every doctor, and a hearty welcome is awaiting you. "Don't Miss This Conference."

WOMEN'S AUXILIARY

(El Paso County Medical Society)

The first meeting of the incoming year was held with the President, Mrs. Gallagher, on October 13. A good attendance and much interesting activity was in evidence, as the Auxiliary had some of its chairmen working during the summer months.

Mrs. J. A. Rawlings reported having been faithful to her duties and had enjoyed satisfactory results from the city to help with weed eradication, of which committee she is chairman. She had also written an article along these lines for Southwestern Medicine and had talked over the radio, urging cooperation from El Paso's citizenship at large.

Plans were made for the year's work; one of the first and most important duties coming to the membership, was to pledge themselves to work in the Community Chest drive. Their aid to the Clinic for glasses for school children, the work of the President on the City and County Hospital Board, the report of the Hygeia and Child Welfare Committee, and various other worthy causes in which these women work, were discussed.

Dr. J. W. Laws, President of the County Medical Society, talked to the organization on the "Interrelated Activities of the County Medical Society and the Women's Auxiliary."

During the summer months the Auxiliary had been invited to Mrs. M. P. Schuster's summer home in the mountains of Cloudcroft, New Mexico, and those whose good fortune it was to be present, reported a most happy and congenial day. Just such courtesies as this has helped put our membership upon a most cordial basis and the activities of many of our new daughters and daughters-in-law who have recently come into the profession through Cupid's ever attentive guidance, also helps us to keep in step with their youthful ideas of doing things.

The organization will meet in the homes of the various members during the year, thereby giving us a more congenial and personal atmosphere to work in. The next meeting will be in the Red Cross Hostess House at William Beaumont Hospital, with the wives of Fort Bliss and William Beaumont as hostesses.

BOOK REVIEWS

HEART DISEASE, by Paul Dudley White, M. D.; Instructor in Medicine, Harvard Medical School; Physician, Massachusetts General Hospital, Boston; MacMillan Company, New York, 1931; $12.00.

Dr. White has certainly achieved his purpose in writing a book on heart disease which will be of "much service to students and practitioners of medicine and which should stimulate investigation into obscure problems of cardiac troubles."

The book is divided into four parts. The first part has to do with examination and symptoms and signs of cardiovascular diseases. The second part deals with the incidences, causes, and types of heart disease. The third part treats of structural cardiovascular abnormalities. Part four discusses the disorders of cardiovascular function.

The author goes into detail in obtaining the patient's history and all the physical and instrumental examinations. The discussion of electrocardiographic methods is especially clear and understandable and should be of great help to any physician who wishes to gain an understanding of this important method of investigating heart disease.

He has drawn fully upon his rich experience for the past 20 and more years in the discussion of the

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"The Thyroid Gland"—Dr. Frank L. Lahey, Boston.
"How Can We Stem the Rising Tide of Insanity in This Country?" Dr. Joseph Collins, New York.

Tuesday:—
Symposium — "Diseases of the Biliary Tract."
Dr. Thos. McCrae, Philadelphia (Internist).
Dr. J. Shelton Horsley, Sr., Richmond, Va. (Surgeon).
Dr. Merrill C. Sosman, Boston (Radiologist).

Wednesday:—
Brilliant Clinic Dinner—Special Entertainment Features.

Thursday:—
Two Symposia.
"Arthritis"—Featuring Dr. John A. Kolmer, Philadelphia.
"Conservation of Maternal Health"—Featuring Dr. Edw. H. Richardson, Baltimore.

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types of heart disease and their incidence and cause. The work shows that he is fully familiar with the extensive literature on the subject.

The appendix contains an extensive bibliography of nearly 200 pages giving the names of the authors, the titles of the articles and the journals in which they appeared. The last part of the appendix contains a list of 100 questions which he says are unsolved cardiovascular problems.

The subject index seems to be unusually comprehensive although I had trouble in finding the portions dealing with the size of the heart. The book has 931 pages.

The type is well chosen for easy reading. The author has a happy way of expressing himself clearly and effectively. He uses splendid English throughout. No typographical errors were detected in a careful reading of the work. There is extremely little about the book calling for criticism. He uses occasional adjectives such as "very," "some," etc., which in no way strengthen the statements. He consistently uses the word people when persons would be preferable. The illustrations are clear and well designed and have excellent legends.

Each physician who is at all interested in heart disease should be interested in the book. Practically every student and practitioner of medicine will wish to have this book in his library.

The author and the publishers both deserve congratulations. O. H. B.

AN INTRODUCTION TO GYNECOLOGY, by C. Jeff Miller, M. D., Prof. of Gynecology, Tulane University School of Medicine; Chief of the Department of Gynecology of Touro Infirmary; Senior Visiting Surgeon, Charity Hospital, New Orleans. St. Louis. The C. V. Mosby Company, 1931; $5.00.

The author of this book recognizes that he is adding another to a field in which there are a number of excellent texts. His experience as a teacher has taught him that the excellent texts on gynecology are too elaborate for the beginning student. Therefore his text has been prepared as an introduction, and is written so the beginner can get the most out of it. He seems to have achieved his purpose. The cuts, mostly borrowed from other works, are excellent and well chosen. The printer's are is splendidly exemplified. O. H. B.

THE MEDICAL CLINICS OF NORTH AMERICA. (Issued Serially, one number every other month.) Volume 14, Number 6, and Index Volume. (New York Number—May, 1931). Octavo of 300 pages with 55 illustrations. Per Clinic year, July 1930 to May 1931. Paper, $12.00; Cloth $16.00 net. Philadelphia and London: W. B. Saunders Company, 1931.

There are a number of highly interesting articles in this issue of Medical Clinics.

On page 1415 Dr. Walter James Highman, in discussing eczema has produced an epigram worthy of frequent quotation. It is: "Words too often freeze thought and start cults." What a sermon might be preached on this text in medicine, in religion and in almost any field of endeavor. Were there nothing else in this volume but this epigrammatic sentence it would be worth while.

Other interesting articles are on rheumatism, arthritis, pneumonia, pyuria, measles treated by blood injections, etc. O. H. B.

CLINICAL DIETETICS, A Textbook for Physicians, Students and Dietitians, by Harry Gauss, M. S., M. D., F. A. C. P.; Instructor in Medicine, University of Colorado, School of Medicine; Assisted by E. V. Gauss, B. A., formerly Assistant Dietitian, Presbyterian Hospital, Denver, Colorado; Illustrated; The C. V. Mosby Co., St. Louis; $8.00; 1931.

Dr. Gauss has succeeded in producing a most practical book in a field already covered by a number of excellent volumes.

The reviewer regards this book as one which he will wish to keep handy as a reference book on the subject of diet.

In subsequent revisions the author will probably cut out paragraphs here and there and considerably shorten the work without lessening its practicability. For example he cites a considerable number of case histories which could be given in much less detail without making them less valuable.

His sample diets with his food and caloric values are especially valuable.

His chapter on the body habitus is particularly interesting and timely. We have all known that it is impossible to have a standard weight for all types of individuals. His division of three types of body habitus makes the weight for these types valuable.

The historical chapter is of especial interest and should be read by every physician.

Physicians generally will find this a practical volume to have for ready reference. O. H. B.

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